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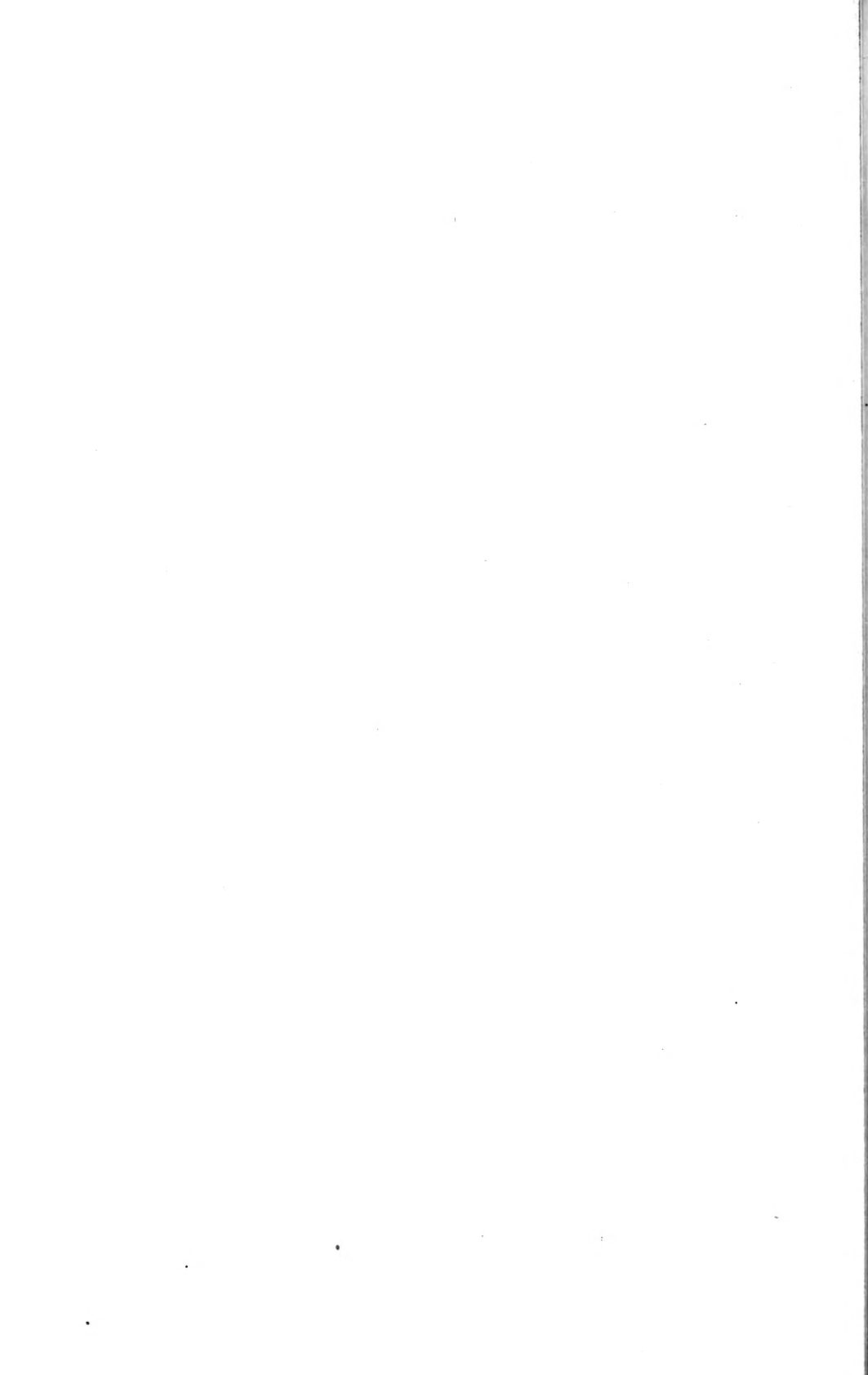
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ARCHIVES
OF
OTOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP
OF NEW YORK

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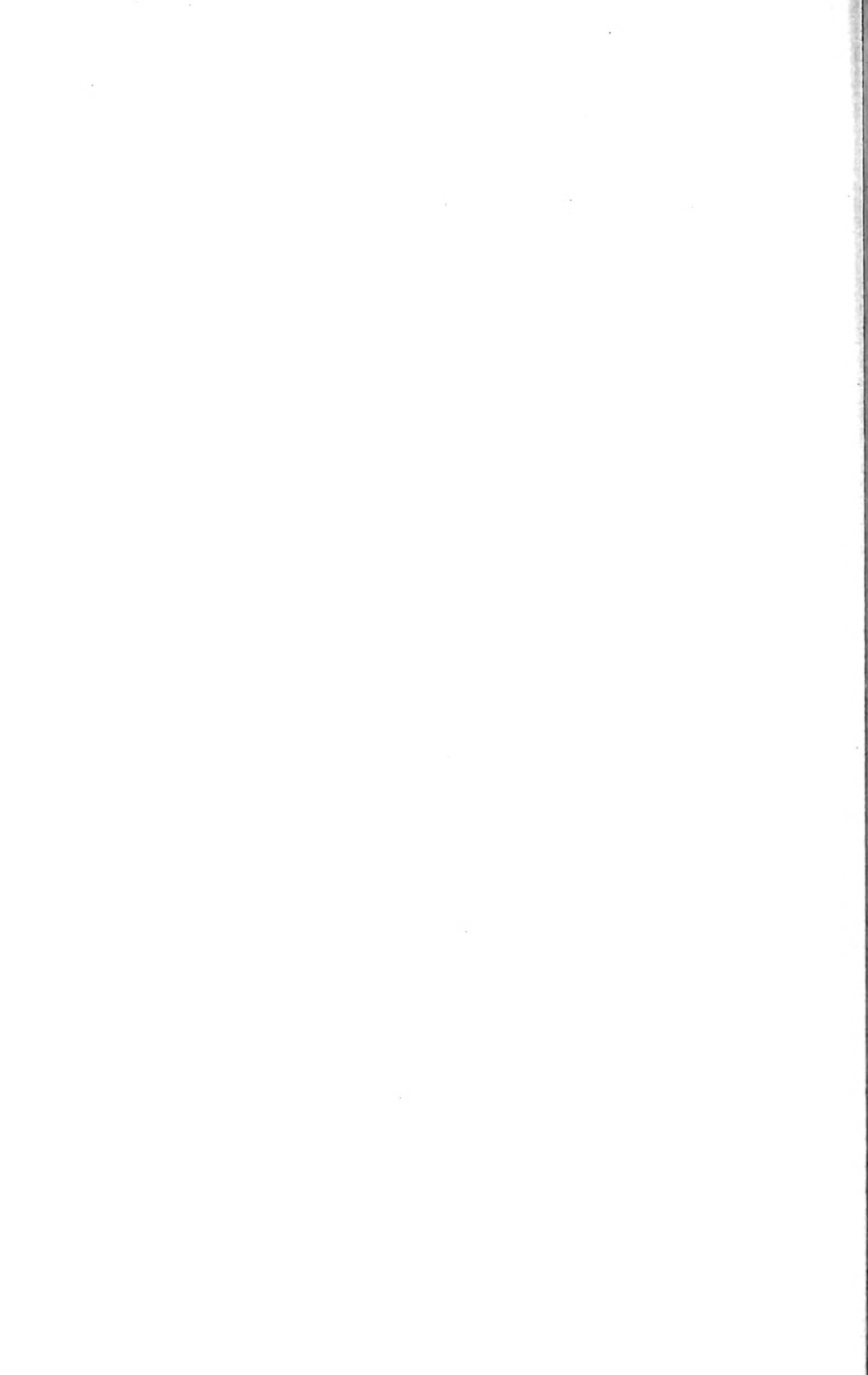
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ARCHIVES OF OTOTOLOGY.

A CONTRIBUTION TO THE SURGERY OF THE TEMPORAL BONE.

By DR. ROBERT SATTLER, CINCINNATI, OHIO.

III.—CHRONIC EMPYEMA OF THE MASTOID CELLS.

(Continued from p. 493 of Vol. XXVII.)

TO establish an accurate diagnosis of these uncommon cases of chronic empyema of the pneumatic cells in which the primary middle-ear lesion, either recent or old, is not in conspicuous evidence, and for which positive clinical features are necessarily uncertain, exploratory surgery is not alone justifiable, but necessary. It alone can disclose the nature and stage of whatever morbid changes may be present at once, and its disclosures often furnish great surprises. It indicates the imperative necessity of supplementary surgical measures which, if promptly and thoroughly carried out, will avert disastrous complications.

It is established on conclusive clinical evidence by the cases here referred to, and by general experience as well, that incarceration of pyogenic products of this region is most prone to occur in broken-down subjects and among convalescents from acute and chronic lesions of the mucous surfaces, especially of the upper respiratory tract, and often also of the gastro-intestinal tract.

A veritable choking up of the cells takes place without clinical attendants either local or constitutional; or these are incomplete and in some cases even entirely wanting.

In other words, the course of such a lesion begins imperceptibly and its subsequent progress is interminably protracted, with clinical evidences almost wholly latent

throughout, or until spontaneous rupture of the contents of the air sinuses takes place externally or internally. If this happens, as it will and must if not anticipated by surgical intervention, exploratory and radical, a definite clinical expression, as Bezold's mastoiditis, medial perforation, epidural and cerebral abscess, pachymeningitis, thrombosis and erosion of sigmoid sinuses, etc., will come about. Such cases, in which the real character of the morbid process is masked during the earlier stages, are of uncertain portent.

In illustration the following cases only are mentioned :

CASE 10.—**Chronic empyema followed by cortical perforation (Bezold) and subperiosteal dissection without perforation. Exploratory operation disclosed real nature. Recovery.**

A. G., æt. thirty-eight, Cincinnati, a woman of strong appearance, whose health, however, had during the last two years been undermined by repeated invasions of illness, was treated by her family physician for a subacute left middle-ear inflammation. The treatment was along lines ordinarily recommended and included rather vigorous inflation. Discharge was profuse and referred to as mucopurulent and stringy. Pain was marked at first only, but with rupture of the drumhead disappeared. Discharge ceased after several weeks, but an ill-defined distress over the mastoid region with frequent exacerbations of pain in the left brow and frontal region persistently remained. More than five months after the acute or subacute seizures, I saw the patient. There was no discharge. The drumhead was dull with perhaps slight periph-
eric injection. Inflation was easily accomplished and a little fluid was still present in the drum cavity. There was neither redness nor swelling over the mastoid, and pressure, even the firmest, did not cause pain. The auricle was not displaced. The lumen of the auditory canal was not altered. Pressure on the affected side, internal to and under the occipital protuberance, and firm pressure in the nape of the neck caused pain and brought on frontal headache.

During the following four weeks, these indefinite symptoms persisted, and though pain in or near the mastoid was never pronounced, it increased in the localities referred to. Movements of the head, especially to the opposite side, were difficult but not especially painful. There was no fever, but patient was dull and listless.

At this stage, or about six months after the onset of the subacute tympanic lesion, an exploratory operation, to be followed by whatever surgery should be found necessary, was finally consented to. It revealed a vascular, thickened, and adherent periosteum over the process, with extensive elevation and a dissecting trail, commencing near its tip and extending towards the occipital region and under surface of the skull.

Perforation of the periosteal covering could not be discovered and there was no infiltration of the soft parts.

After enlarging the external opening this was incised and a quantity of offensive pus escaped. Further exploration led at once to the discovery of several fistulous openings in the bone near the under, outer, and inner border of the tip. The cortex was greatly thickened. A large quantity of pus and granulation tissue filling the cells was removed. It was found that the deeper cells, or those adjacent to the antrum, were less involved, but these as well as the antrum were thoroughly exposed.

Bone perforation had resulted near the extreme tip of the process on its lateral and under surface in several places. The periosteum, however, had resisted the burrowing pus, and at the time of the operation there was no implication of the deep cellular fasciæ of the muscles. The subsequent course was favorable and the patient made a speedy recovery.

CASE 11.—Bezold mastoiditis: latent course, multiple external perforations of cortex with dissection and perforation of periosteum. Operation (Schwartz). Recovery.

M. S., æt. twenty-four, a young medical student, residing at Falmouth, Ky., had a subacute left middle-ear lesion. This had been treated for several months by routine inflation. Then came about, gradually, pain and swelling, localized to the occipital region. At times, lasting for days, there developed a soreness of the entire scalp, which the least exertion increased. The discharge at one time was said to have been profuse, but never purulent. These symptoms continued for six months or longer. He became emaciated, and was dull and listless. His physicians incised what was supposed to be a suppurating lymphatic gland in the occipital region, and another on the left side of the neck. It can be inferred that these were the superficial pointings of trails of burrowing pus. At this stage he came to me. The tissues of the neck and occipital region over the entire left side and embracing the mastoid locality to the nape of the neck, were

the seat of a firm, œdematous swelling. The head was carried in a fixed position, and all movements were painful. General septic infection had taken place, evidenced by rigors and a high and rapidly fluctuating temperature with profuse perspiration.

Surgery was resorted to without delay. The entire mastoid was choked with pus, to its very tip and to the antrum. Numerous lateral perforations were found, which had discharged the contents of the infiltrated cells into the deep connective tissue and muscular septa. The entire affected region was exposed for inspection and effective drainage. The infiltration of the soft parts and the fistulous trails which were opened, healed slowly, but recovery finally ensued.

It is evident that in both cases more timely surgical interference would have averted complications which, in the last instance, might have resulted fatally.

The most marked illustration of Bezold mastoiditis which has fallen under my observation occurred in an old woman, broken down in health.

The entire early stages of empyema in this case, as in so many others like it, were wholly latent, and only a chronic, catarrhal middle-ear lesion, with occasional subacute remissions, could be assumed to be present, from the rather imperfect history obtained after the operation.

It is mentioned, not because of its rarity or uncommon expression of that variety of mastoiditis for which we are indebted to Bezold for such complete description and explanation, but because it was deemed expedient to amputate the auricle in addition to the most radical surgery for the bone lesion.

CASE 12.—Bezold mastoiditis: multiple perforations of bone; dissecting trails; cachectic appearance. Recovery.

On admission to the hospital, the patient, a woman, æt. sixty-eight, broken down in health and strength from poverty and disease, and with every evidence of general septic infection, was, without further inquiry concerning the antecedent history, prepared for immediate operation. The swelling and infiltration of the tissues of the neck, and in particular on the affected side, where numerous fistulous openings were found discharging offensive pus, were exceptionally marked.

The lumen of the auditory canal was contracted, and it was filled with pus and granulation tissue, the result of fistulous openings into and through the cartilaginous portion. The auricle itself was enormously swollen and discolored, and on its posterior and anterior side showed circumscribed elevations of the perichondrium. It was not markedly displaced, but as it was so hopelessly infiltrated and its attachment undermined by many fistulous tracts, it was amputated. After this followed the most radical surgery. The indications which rendered this necessary were unmistakable. The cells, antrum, and middle ear were fully exposed for inspection and treatment. The subsequent course of the case was tedious, but in the end favorable. Before the operation, facial paralysis was present, and this became more marked after the operation. The entire cortex was loosened by the pathological process, except above, owing to the numerous lateral perforations and those near the tip. With little difficulty it was lifted off entirely, as it was only necessary to detach the upper border of this region.

The recital of these cases only bears out known and accepted conclusions.

Formerly signal importance was attached to localized pain and swelling of the mastoid region, deflection of the auricle, and to abnormal temperature. They were in the main considered the symptomatic indications for surgical treatment. If found wanting, such interference was often not considered imperative; unnecessary, often fatal delay resulted, while surgery was looked upon as unjustifiable until a more positive declaration of the morbid process had come about.

Not infrequently, however, even in these much less common cases than those associated with chronic purulent processes of the middle ear, a lethal termination surprised the unconcerned and inactive surgeon.

An exploratory operation was rarely thought of or advised. In support of this statement, we have only to recall our own experiences with such cases, if it takes us back ten or fifteen years. It cannot fail to recall to mind unhappy memories.

The useless delay and absolute failure to appreciate the opportune moment for preventive surgery, in the present

light of our knowledge, can, in exceptional cases only, be charged to the aural surgeons.

We now know from common experience that these rare expressions of empyema are made conspicuous by the absence of one or all of the symptoms just referred to, and which formerly were considered so essential to justify surgical treatment.

In these cases, what shall guide or direct the advisability of preventive surgery in order to avert the more serious complications which are certain to happen? To this can be answered only, that it is the knowledge obtained through exploratory surgery, from individual and common experience. The absence of all the so-called cardinal symptoms is never a contra-indication to surgery, exploratory or otherwise. It is sufficient if the history refers to a recent or remote middle-ear lesion, even though it was known to have been only a catarrhal and not a purulent process, and if the patient manifests a dull or apathetic frame of mind, which persists, together with general lassitude and ill-defined but general headache on slight exertion,—the indications for interference are at hand.

Careful study of these cases suggests the following conclusions.

It not infrequently happens that chronic empyema of the air cells of the mastoid region develops not only after purulent otitis media, but also after acute and subacute catarrhal processes; the uncommon feature of these cases being *that the primary lesion of the middle ear is at no time in marked evidence. It would appear also that the focal lesion within the cells owes its origin not always to a direct extension from the tympanic cavity or antrum, but in some cases to a forcing or mysterious wandering of pyogenic products from the upper respiratory tract, along the Eustachian tubes, into (and this is a discovery disclosed by surgery) the most remote or external recesses of these air spaces of the temporal bone.*

Other less uncommon features are the imperceptible starting and interminably slow course as well as the uncertainty of the clinical features which accompany such cases. It is often only spontaneous perforation of the cor-

tical covering of the bone, or epidural abscess and dissection, or even more serious complications with almost certain declaration of their gravity, which point to or lead through surgery to the discovery of the real nature of the lesion.

Again it may happen that, *owing to the presence of a thick cortex or other individual peculiarity*, the gradual progress of the focal lesion within the cells does not excite the complications referred to, but *lights up afresh and suddenly an acute purulent process within the middle ear or antrum with general and local symptoms demanding immediate interference.*

My experience has furnished me with several cases confirming the truth of this last statement, and in conclusion of this subject, brief mention of a recent observation which bears upon this point is made.

CASE 13.—Acute otitis media purulenta, chronic latent empyema of the cells, reinfection of the middle ear. Operation (Schwartz). Recovery.

A rather frail and markedly neurotic woman, aged thirty-two, gave me the following brief history: Two days ago she began to suffer intense pain in the left ear and entire side of the head. Her physician had prescribed either a solution of cocaine or atropine. After the first instillations of the drops, the pain increased, and, as is usual in such cases, she assigned her sufferings to the medicine. Further inquiry brought out that for several months (five or six) she had subacute paroxysms of so-called grip, persistent cough, fever, and great prostration. She also complained of tinnitus constantly, with almost constant general headache which at times only, became more pronounced on the left side, especially in the frontal region. Examination disclosed an intact but injected and bulging drumhead. No swelling or redness of the mastoid region, and no displacement of the auricle. Only the firmest pressure, and this only in one locality, and made from below upwards against the tip of the process, caused pain. The pain in the head was general, but in the ear and left frontal region in particular, was violent; rigors were frequent, and temperature high.

Guided by experience in former similar cases, I did not paracentese the drumhead and resort to an expectant course, but on the same day opened the mastoid with the following disclosures: A succulent thick cortex, the superficial cells filled with pus and

granulation tissue, and as the deeper cells were reached a lesser amount of granulation but more pus. Owing to the general implication of the cells, it was necessary to expose the remotest cells of the tip and an unusually large opening in the bone had to be made. In spite of broncho-pneumonia, and temperature suggesting septic infection, with erysipelas of the wound, face, and scalp, she made a good recovery. No discharge occurred from the ear and the drum did not rupture. Whatever accumulation there was, found vent through the large and free communications of the antrum.

It is hardly a tenable inference that a collection of fœtid pus and the large quantity of granulation tissue, such as was found in this case, could have resulted within the short period (60 hours) which intervened between the first violent pain and the operation. It is, in my judgment, an apt illustration of a sudden acute reinfection of the middle ear from the hidden pyogenic focus within the cells, which was originally started by a less virulent primary lesion of the same locality, but which was never even at its inception, or throughout the course of the secondary lesion, in marked evidence.

IV.—EPIDURAL ABSCESS AND DISSECTION.

Just as external osseous perforation, under the clinical picture, and after assuming a definite expression as Bezold mastoiditis, is not an infrequent sequence of an undiscovered chronic latent empyema of the cells, it also happens, although a more uncommon occurrence, that internal perforation of the bone, followed by epidural, cerebral, or cerebellar abscess, as well as other central complications, proceeds from the same cause.

The evidence herewith offered in support of this statement confirms those known conclusions, that erosion of the tegmen of the mastoid antrum or the thin roof of the adjacent pneumatic cells may be as insidious as the primary lesion within the cells. Clinically the secondary lesion is characterized by the same latent course which typifies the one of which it is only a more accentuated and dangerous complication. It is evident that external perforation, unless

preventive surgery intervenes, is more likely to happen than internal erosion of the bone.

This is accounted for, in certain cases of this uncommon class, because the pyogenic transplplantation begins its destructive excavation in the outermost cells or those in the tip or adjacent to the cortex of the mastoid region. If, as is usual, the grade of inflammatory activity is low and the bone not abnormally thick, the most favorable conditions for an extension towards external ulceration are afforded. But here again we dare not lose sight of the many curious anomalies due to various causes, individual and acquired, which affect the thickness or thinness of the bone in this particular locality and which will in one way or another influence the progress and definite declaration of the morbid changes which are present.

It is precisely this point which is not sufficiently taken into account. Not until exploratory surgery discloses them can the results of former pathological processes, about which no positive information exists or can even be assumed, receive adequate recognition.

How often does it happen, that in some cases in which only the most indefinite history of an antecedent lesion can be obtained, and in others with almost certain knowledge of the absence of intra-tympanic disease and its complications, we, nevertheless, find pathological markings of the bone of the outer cortical wall and the tegmen of the tympanum and mastoid antrum, which in some cases are compensatory and sclerotic, in others are rarefactive and atrophic.

This known fact enables us to understand, not alone the treacherous and latent course of chronic empyema of the cells, but it directs our attention to one of the more uncommon causes for epidural, brain, or cerebellar abscess, sinus thrombosis, etc.

The following cases bear upon this statement.

CASE 14.—Chronic empyema: absolutely latent course; internal osseous perforation; epidural abscess. Recovery.

H. B., æt. thirty-eight, Carthage, O., a sturdy German with previous history of good health, had for many months sought relief in vain from intense, almost constant pain in the head. It

was not localized but general. During the last eight weeks it was constant, and prostration resulting from unrelieved suffering was excessive. Recently, also, the pain was frequently localized to the brow and left frontal region. For two weeks prior to his visit to me almost unbearable hammering and beating pain, which every jar or bodily movement intensified, was added. He was pale and haggard in appearance and moved about with caution and deliberation. He complained that the slightest attempt to stoop forwards or to exert himself intensified the pain in his head, which he could not localize. The least mental excitement also brought this about. He was dull and apathetic, and had frequent attacks of vertigo and syncope with profuse perspiration, often preceded by nausea, and he often vomited without cause.

An old discharge, which at times was foetid, was found in the left ear. This had not changed in amount or character for years. The meatus, especially the osseous portion, was of wide lumen, and carious localizations in and near the annulus tympanicus were found, as well as marked destructive changes on the part of the drumhead and ossicles. *There was absolutely no redness nor swelling, and not even tenderness over the mastoid process.* The auricle was not displaced. *The firmest pressure and most vigorous percussion failed to localize pain in this region.*

The operation resorted to for diagnostic and exploratory purposes disclosed an uncommonly thick and hard cortex. After this was ablated, and at considerable depth, an unusually large cavity, containing foetid pus, with extensive osseous erosion of the roof of the mastoid antrum and adjacent cells, was discovered. The dura was covered with thickened layers of caseated pus and florid granulations. A probe led to the further discovery of extensive burrowing of pus in the vicinity of the osseous erosion. The entire region was converted into one large cavity.

The subsequent progress was tedious, but favorable in the end.

In this case the extensive thickening of the cortex, produced in all probability as a result of a chronic process which had for years invaded the pneumatic spaces of the bone, was mainly responsible for the latent and uncertain clinical evidences, and also for the absence of every local sign. The secondary lesion was for the same reason equally insidious and latent until excessive increase of intra-cranial pressure and septic absorption called attention to it.

That an extra-dural abscess may long remain without positive clinical disclosures, mention is made of another case not directly concerned with these cases of latent chronic empyema, for in this one were present local evidences which suggested purulent infiltration of the bone.

CASE 15.—Chronic empyema: epidural abscess; erosion of tegmen of mastoid antrum. Operation: temporary relief. Eight months afterward epidural abscess, erosion of tegmen of tympanic cavity. Radical operation. Recovery.

In this case, M. H., æt. seventeen, Jackson, O., the evidences of a former Bezold mastoiditis were unmistakable. The fistulous openings and tracts had healed, and for almost two years there had been no external opening. A fœtid otorrhœa, however, persisted. There was slight swelling only, some redness (dusky discoloration, but no engorgement of the superficial venous channels of the tissues of the neck, and no evidences of overfilling or of obstruction when compression was resorted to), and great tenderness. Pressure against the mastoid region made the patient dizzy, followed by involuntary rotatory movements of the head, and she fainted easily. She was dull and depressed; her expression flaccid and anxious. The slightest exertion brought on perspiration. Septic infection, as evidenced by temperature, rigors, and prostration, was unmistakable.

The mastoid region was opened. The periosteum was thickened and adherent; the cortex was thin, and the texture of the bone throughout was soft and when removed disclosed one large irregular cavity full of pus and granulation tissue. An extensive osseous erosion in the roof of the mastoid antrum exposed the dura, which was undermined for a considerable distance by the pus. The sinus was exposed for inspection, but no evidence of thrombosis or obstruction was found.

The large opening was packed for weeks and was eventually permitted to close, but pain in the head, and especially dizziness, continued, nor did the patient regain her buoyancy of mind and body. She lost in flesh, was without energy, and from time to time, for weeks, had unmistakable septic fever and its attendants. After eight months she returned for further treatment. Suspecting an erosive lesion of the attic, the radical method to expose this region and further surgery for the old lesion were practiced.

In order to expose fully the epitympanic cavity, the middle fossa, owing to the thinness of the bone perhaps, was opened and

at once led to the discovery of an epidural abscess compressing the temporo-sphenoidal lobe. After removal of the entire anterior wall, an erosion of the bone in the roof of the tympanic cavity was found. The meatus was split after the suggestion of Stacke, and drainage and packing were effected through the meatus, and the posterior wound was allowed to close. Recovery after this was uneventful, and she gained rapidly and permanently in health.

This case does not properly belong to this category. It is mentioned to show how latent and uncertain are the evidences of internal osseous perforation and burrowing pus.

It is almost certain that this epidural abscess was present at the time of the first operation, starting from an independent focus, *i. e.*, the tegmen tympani, but was overlooked because it was overshadowed completely by the disclosures in the principal seat, the mastoid antrum and roof. Finding the pathological process so pronounced in this locality, it was assumed that all the symptoms could be accounted for, and as the most thorough and freest drainage was secured, it was not thought expedient to expose the epitympanic cavity during the first operation.

(To be continued.)

THE APPLICATION OF HYDROCHLORIC ACID IN AFFECTIONS OF THE BONY WALLS OF THE TYMPANIC CAVITY AND THE MEATUS.

By DR. OLE B. BULL, IN CHRISTIANIA (NORWAY).

Translated and Abridged by Dr. JULIUS WOLFF, New York.

IN vol. xviii., p. 123, of these ARCHIVES, I published an article entitled, "The Treatment of Necrosis and Caries of the Temporal Bone by Means of Acids." My experience at that time had extended over two years only, so that the article, as far as the clinical part was concerned, should be considered merely as a preliminary report.

The results were, however, so favorable, that they spurred me on to further investigations, which soon demonstrated that the application of acids, especially hydrochloric acid, might enable us, in many cases, to dispense with all other forms of treatment.

Since the publication of my first treatise 49 patients have been treated with hydrochloric acid up to July, 1896. As statistics are apt, however, to lead to erroneous results unless the material is most carefully tested, I will draw my conclusions only from those cases in which the records state that crepitation, the only sure sign of bone disease, was actually felt with the probe. This reduces the above number to 35. Of course, bone disease may be present even when, on account of outlying soft parts or inaccessibility, crepitation cannot be obtained. This applies especially to caries of the ossicles.

These 35 cases form my statistical basis for judging the effectiveness of the hydrochloric-acid treatment.

If we were to consider as cured such cases as were, at the completion of the treatment, freed from their discharge, and in which the only remaining subjective symptom was the functional impairment caused by the ravages of the bone disease, then the proportion of cured cases to those not cured would be as 24 to 11; that is, 70 per cent. would be cured.

These conclusions would, however, be more favorable than the facts warrant. For, considering that the disease is of such a chronic nature, we ought not to assume that a patient has been cured unless we have been able to ascertain that a recurrence has not taken place within a reasonably long time—that is, within about a year. I have been able to convince myself that 13 of the above 24 cases, which showed no symptoms at the end of the treatment, were definitely cured. The remaining 11, which I was unable to follow up, I therefore class as not cured.

I believe everybody will concede that the figures I obtain by this method, namely, 37 per cent. of cures among the whole 35 patients, do not give too favorable a result. In my opinion, I would arrive nearer to a correct result if I were to leave out altogether the cases which I was unable to see a year after the completion of the treatment. In that case the cures would amount to 13 out of 21, about 60 per cent. But taking into consideration the optimism to which one inclines in judging a method of treatment that one has devised oneself, it is safest to assume cures only in those cases in which a recurrence after a considerable period of time could surely be excluded.

Granting that only 37 per cent. of the patients are cured, the result is still so favorable as to make the general application of this method in practice desirable. Its advantages over operative treatment are, first, that it is entirely devoid of danger; and, secondly, that it allows the patient to continue without interruption with his occupation. It leaves no disfiguring scars, and, finally, it is so simple that it can be employed by any physician.

Proleptically, we would expect the best results in those cases where the acid can act directly on the diseased area of

bone without its being diffused over a large surface ; for in this way the most favorable circumstances for the decalcification and later absorption of the bone exists. The best results would naturally be expected where the diseased bone is accessible to view. Next in order would be those cases in which the necrotic bone can be reached only with the probe. We cannot, however, summarily reach these conclusions from the statistics of my own practice ; at least, not if we consider only the above-mentioned 21 cases.

Of these the diseased area involved :

Among the cured : in 5 cases the lateral wall of the attic as well as the inner end of the bony meatus ; in 4 the inner wall of the tympanic cavity ; in 2, larger portions of its walls ; in 2, the meatus.

Among those not cured : in 2 cases the lateral wall of the attic ; in 2, the upper posterior wall ; in 1, large areas above and behind ; in 2, the inner wall ; in 2, the bony meatus.

Apart from the fact that these figures are too small to warrant drawing conclusions from them, they do not give the same clear insight into the actual circumstances that the case-books give. For the latter show that the best results are obtained when the acid can be made to act directly on the affected bone. But its situation is not the only determining factor ; its extent, as well as the consideration whether it is in part covered by skin or mucous membrane, is also of great significance. This last condition is especially apt to affect the duration of the treatment unfavorably, as can best be illustrated by a few extracts from my case-books.

CASE 1.—Christine L., age fifty-six. Discharge from the right ear existed as long as she can remember. Only small remnants of the ear-drum are visible above. The mucous membrane is granulating and is partly covered by a polyp. After its removal, large areas of bare bone were visible on the promontory. After three applications of cotton steeped in 4 % hydrochloric acid, crepitation could no longer be felt. The treatment lasted from the 9-20 of August, 1890, and from September 29, 1890, to February 7, 1891. Recently she wrote me that she has been free from her complaint since that time.

CASE 2.—Pernille B., age twenty-five. In both ears otorrhœa since she had scarlet fever at the age of five or six. R. a large polyp; L. granulating mucous membrane. Large loss of substance in both membranæ. After removal of the polyp, bare bone could be felt on the inner wall. The acid caused an extremely large swelling, white in color and like cartilage in consistence. Pricking into this with a needle caused punctate hemorrhages. The acid was applied four times. After absorption of the white swelling, the inner wall became covered with granulations. The discharge gradually ceased. Treatment lasted from July 1 to August 6, 1892. When I saw the patient last on June 30, 1893, the discharge had ceased in the right ear, but not in the left. The acid had not been applied there because no bare bone could be found.

CASE 3.—Miss M. L., age sixteen. Discharge from right ear for ten years. Posterior inferior portion of the membrana tympani destroyed. Behind the promontory, bare bone can be felt. The presence of a rather large but only slightly movable sequestrum could be made out. As I tried to remove it with the forceps, only a small piece followed. As further attempts caused pain, hydrochloric acid was applied. After two applications of the acid, the affected portion swelled considerably. No hemorrhages were visible after pricking the swelling. All odor disappeared and the discharge diminished markedly. Treatment was from July 9 to August 3, and from November 20 to December 12, 1895. Four applications of the acid were made. When I saw the patient last on September 14, 1897, there still was a little mucous, odorless discharge to be seen. The mucous membrane was smooth; behind the promontory, there was a depression. Bare bone not to be found.

In these three cases the affected portion was quite extensive; three or four applications of the acid, however, caused it to be absorbed. Perhaps curetting might have brought about a cure in as short or even a shorter time. We may, however, assume that the acid acts just as surely and much more mildly; besides, only few patients consent to an operation.

Whenever the diseased bone is covered in greater part with mucous membrane, the decalcification seems to progress considerably slower.

Two cases surely are in favor of this. One of them has already

been discussed (Case No. 4 of my first article). In this patient, crepitation could be felt at only one small spot. Each application of the acid provoked a very severe swelling of the promontory and the surrounding parts, but the discharge could not, in spite of continuous treatment, be made to cease, although it gradually became more scanty, so that now the patient need only dry her ear once or twice a week with a little cotton. She presents herself only once a month for examination, and is well pleased at having been spared an operation.

The second case was just like the previous one ; in this patient, a girl of six years, the promontory was also affected. She was treated about one year, with interruptions. The discharge is so moderate that it often cannot be noticed for months. Yet she is not entirely freed from it.

In the following case the cure was comparatively quick, although the disease was rather extensive :

CASE 4.—Shoemaker M., aged twenty-six. When nine years of age patient had scarlet fever and since then discharge from the right ear. Before he came to me in June, 1896, he had been in the State hospital for ear diseases, where an operation had been advised. The patient states that six months ago his face had become crooked and twitching had occurred in the right side of his upper lip. Of late he had been suffering considerably from headaches and dizziness.

The facial paralysis is almost complete ; the patient is very deaf on the right side ; otoscopically a rough necrotic area, partly covered with a half-dried offensive secretion, is visible. With irrigation two thin layers of bone, about 2 *sq. mm* in size, were removed. Thereafter the granulations were gently curetted away, and then a fairly large piece of cotton stuffed in four-per-cent. hydrochloric acid was inserted. On the following day no longer any odor. A few days later the facial paralysis was no longer complete, inasmuch as the patient could move the lower lid a little and at times could whistle. At the end of July only a slight paresis was noticeable. The headache and dizziness had entirely disappeared ; the discharge was but slight. After that, continuous improvement. From the beginning of August, 1896, he has presented himself to me only a few times. When I sent to him on May 2, 1898, he informed me that he had been entirely well the last few years. On a few occasions when he had "caught cold," a slight mucous discharge appeared in the ear ; the latter has now

been dry for several months. No secretion could be found either on inspection or by introducing a cotton-carrier. He can now completely close his eye ; whistling, however, requires some effort on his part. The acid had been applied five times.

In my last article I mentioned a case in which very extensive destruction of the upper portion of the internal wall and the overlying parts had been brought about by caries. The later course of the case was such that the cause of the bone disease had to be considered a reflex neurosis. Although the acid did achieve a diminution of the discharge and of the eczema of the auricle caused by it, as well as a decrease in the dizziness and unpleasant sensations in the head, still the discharge did not cease in spite of the prolonged application of the acid. After the patient had come to me twice a week for a year she grew tired of the treatment. When she returned after six months, she stated that the discharge as well as the subjective symptoms had suddenly ceased with the removal of some carious roots of teeth. Only after three years the discharge, accompanied by headache and dizziness, began anew after she had received a cold douche on the head during a bath. The affected parts at the time of the examination were covered by a thin, half-dried secretion.

In those numerous cases in which the lateral wall of the attic or the posterior, upper portion of the meatus are attacked, the action of the hydrochloric acid seemed to be especially favorable. This is just what we would expect, for in these cases the cotton soaked with acid can be introduced directly into the opening which generally is situated just above the head of the hammer. Thereby the cotton is kept in place so that the acid can act thoroughly upon the surrounding diseased bone. In my former article I discussed such a case, and several months ago I had the opportunity to see the patient again. During the past ten years the patient had experienced no recurrence of his former trouble. The appearance of the drum-membrane was the same as in the otoscopic picture made directly after the completion of the treatment.

In the subjoined case I was also able to convince myself that the cure was a permanent one :

CASE 5.—Thore K., age seventeen. When I first saw the patient, on November 11, 1888, he had been suffering for two years from discharge from the left ear. The watch was heard on the right side at a distance of 17 *cm*, on the left not until held against the auricle. The right membrane shows traces of an old otitis media; the left one is smooth and strongly injected. Above the head of the hammer is a crater-like hole, with yellow edges which are very deeply notched, especially below. The hammer is lower, and its upper end more prominent than normal. On the inflation of air, abundant râles can be heard in the tympanic cavity. When a probe, bent at a right angle, 2 *mm* from its end, is introduced into the hole at the upper border of the membrane, then turned so that the short arm points up and drawn outwards, crepitation can be felt. Treatment lasted till the end of April, 1889. The acid was applied no less than eleven times. Up to April 29, 1892, when I saw him last, there had been no recurrence. The otoscopic picture had not changed from the time the discharge ceased.

In six other cases in which the disease showed a similar picture (a hole at the upper border of the membrane and greater or less luxation of the hammer in a direction down and out), the discharge ceased with the acid treatment, the hole cicatrized, or at least became much smaller, and the hammer resumed its normal position. From none of these patients, however, have I been able to obtain later information.

The treatment in these cases is generally a rather protracted one. The cause for this was found to be the difficulty in obtaining free drainage for the secretion, even when an opening is made below. In the presence of these conditions, often

the ossicles are affected.

For this reason it is not rarely necessary to remove the hammer. In only 3 out of 6 cases in which I removed it from patients treated with the acid it was curious. Two of these 6 patients were not cured; of 1 I had no later reports; 3 were cured, but only 1 of them is counted among the cured cases, because I had to assume that in the other 2 cases it was the removal of the hammer and not

the treatment with the acid that effected the cure. None of the cases showed the least action of the acid upon the hammer. *From this I conclude that the hydrochloric-acid treatment is not indicated where the ossicles are the seat of the disease.*

DISEASE OF THE BONY MEATUS.

When the inner portions of the upper wall or the annulus are diseased, hydrochloric acid will often effect a cure in a very short time. It appears that it is better borne by the innermost part of the canal than by the outer. Even here, however, good results can be obtained if only a small area of bone is diseased; *but if larger areas are necrotic the treatment with acid is not suitable.*

CASE 6.—Hans V., age eighteen, came to me on April 27, 1889. From the time he was two or three years old there has been a discharge from his left ear. A polyp now projects about 12 mm from the external opening. The patient has suffered from intense headache during the last two weeks. When the polyp was removed, by means of a wire loop, a large amount of pus escaped. The small remains of the polyp were destroyed with chromic acid, whereupon bare bone could be felt at one small area. The patient left town, but returned after several weeks, as the headache had reappeared. After two applications of hydrochloric acid a whitish, triangular mass of cartilage appeared at the point of disease. After five days it was absorbed, and the hole almost cicatrized. On October 19, 1895, the patient was seen for the last time, having returned on account of an eczema in the outer ear canal. No discharge during the interval.

CASE 7.—Conductor J., age twenty-five, consulted me on October 19, 1886. Necrosis in the meatus. Discharge ceased after treatment of very few days' duration. Patient returned at the end of February, when there was discharge again. Granulations were found above in the canal, and with the probe bare bone could be felt in a depression a few millimetres in front of the membrane. When the acid was applied the first time the patient experienced such great pain that he fainted. The four following applications, however, were almost painless. The discharge ceased after three weeks' treatment. Thereafter no discharge till January, 1892. The use of hydrogen peroxide soon caused it to cease. No bone

disease could be found at that time, and since then the ear has remained dry.

CASE 8.—Plumber K., age sixty-five. When the patient first consulted me, on December 27, 1890, a polyp had existed in his left meatus for several years. The end of the polyp was visible in the external aperture. On account of the patient's sensitiveness I was not able to remove the polyp by means of the snare and therefore used chromic acid. This treatment caused it to disappear in three weeks, during which time the patient presented himself twice a week. Soon after the polyp again began to grow and when I saw the patient again I felt bare bone over a large area of the anterior wall. Toward the end of May the discharge diminished under antiseptic treatment, and for a time bare bone could not be felt. After a month, during which time I did not see the patient, the meatus had become very narrow on account of a swelling in the soft parts, while a projecting, bare edge of bone could be felt above. I now suggested an operation to the patient, but he did not consent. I therefore applied the acid. *After each of two applications he experienced severe pain, and during the third the pain became so unbearable that I had to omit the further use of the acid.* When the patient again presented himself in October of the same year the condition was unchanged. After that I did not see him again.

In my first article I already drew attention to the sensitiveness of the meatus to the action of acids, and cited an example which showed how even a 2-per-cent. solution of the acid can produce a necrosis in the skin of the meatus.

In cases like those mentioned above I have frequently used concentrated sulphuric acid and thereby achieved a more rapid cure. The pain is not especially great with this treatment and is of short duration.

Of course it is also possible to obtain the desired result by curetting.

When larger portions of the auditory canal are attacked, the removal of the diseased parts is positively indicated. According to my own experience the action of the acid is most favorable in those cases in which the tympanic cavity is the seat of disease, and therefore, that this method of treatment may not fall into disrepute, I would recommend it only for such cases. It can even be used in cases of

chronic purulent otitis in which no crepitation can be elicited, provided a cure is not effected within the proper time by means of the ordinary treatment. The acid can surely do no harm; on the contrary, since it has a marked germ-killing action, it will often be of use. This is plainly shown by the fact that the secretion becomes odorless. The occasionally very marked hyperæmia which may follow its use, always disappears in a few days. The use of the acid in doubtful cases has often resulted in my discovering disease of the bone which had up to that time escaped my attention. *For the diseased bony tissue always swells considerably under the influence of the acid.* If the diseased bone is connected with the healthy bone, the swelling, which is of a whitish color, becomes vascular; when pricked with a needle, dark blood-spots appear upon it. This does not happen, however, if the case is like that described under Case 3.

Inasmuch as the swelling is often considerable it might be feared that under certain circumstances pain would be caused. But only in one case have I known patient to complain of unpleasant beating or pressure in the ear after the treatment, which, by the way, might just as well have been due to hyperæmia.

In conclusion a few words about **the application of the acid.**

In cases where the bone was visible I spread the cotton soaked with a 4-per-cent. solution of the acid over it. On the following day I generally found the cotton still in the same place. If there is an opening in the upper part, the cotton is introduced into it, and removed the next day with a pair of forceps or a small hook, the latter being turned around in it. If the opening is rather large, the cotton may also be removed by irrigation. The acid is applied, generally, at intervals of a week. Otherwise I am governed by the extent to which the mass of cartilage is absorbed. If this process is complete and the discharge still continues, or again becomes offensive, I reapply the acid.

An after-treatment is sometimes required because the catarrh does not always cease together with the bone-disease.

REMARKS ON MASTOID OPERATIONS, WITH A CASE OF BEZOLD'S MASTOIDITIS.

BY DR. E. GRUENING.

THE operative procedure practised by Schwartze on the mastoid process in acute inflammatory affections of this bony region has been described by his pupils as Schwartze's typical chiselling operation to open up the antrum mastoideum.

Though no objection can be raised to this wording, since it conveys the idea "*ex potiori fit denominatio*," it has nevertheless caused an erroneous estimate and a narrow construction of Schwartze's method, of which the exposure of the mastoid antrum constitutes the most important, yet by no means the sole feature. Schwartze says distinctly that the prime object of the operation is to lay bare the antrum and all pneumatic spaces which contain pus, and he criticises those operators who in the so-called Bezold's mastoiditis confine their attention to the tip of the mastoid and neglect the antrum.

The operation which I practise lays open the pneumatic cells of the mastoid and deals effectively not only with cases of pure antrum involvement, but also with complications on the part of the tip and its neighboring tissues. The operation consists in the systematic removal of the external wall of the mastoid process from the apex to the *linea temporalis*. I generally begin below, expose the terminal pneumatic spaces, remove pus, granulations, and diseased bone, and convert the cells into one spacious cavity. The relation of the sigmoid sinus to the antrum is then determined, and

the antrum generally reached without difficulty. The operation, which is essentially Schwartz's, has the advantage of securing a speedy and uninterrupted recovery without revision.

The following case demonstrates again that in purulent otitis media the perforation in the drumhead may close, hearing may be restored, and the patient may appear better, while the process of destruction continues in the direction of the sigmoid sinus and the tip of the mastoid. The history of the case is in brief as follows :

In June of 1898 the patient suffered from pain in the right ear. He was examined by an aurist, who pierced the drumhead. The pain subsided and the ear began to discharge. In about two weeks the patient considered his ear trouble at an end. A few weeks later he was attacked by violent chills. The diagnosis of malaria was made, and a change of air thought necessary. The patient was sent to the mountains, where he grew worse. He returned to the city and came to my office in the latter part of September. His right cheek and the retro-maxillary region were swollen, and the tip of the mastoid and an extensive post-mastoid area were tender. In the external auditory canal nothing abnormal was found. The drumhead was whole, and with the right ear the patient could hear my watch (audibility, 24 inches) at a distance of three inches, and follow ordinary conversation with ease. At the operation performed on October 1st the mastoid was exposed. The cortex appeared sound. When, however, the tendon of the sterno-cleido-mastoid was detached a large quantity of pus welled up. Upon closer inspection it was found that the pus occupied the digastric fossa, had burrowed its way under the parotid gland, and also formed an abscess in the substance of the sterno-cleido-mastoid muscle.

These abscesses were freely opened, and it was necessary to cut through the parotid gland in order to reach the pus tracks. The hard cortex of the mastoid was then removed. No pus was found in the antrum, but its posterior wall showed a perforation which led into the groove of the sigmoid sinus, where a large collection of pus surrounded the vessel. In the tip of the mastoid and in the posterior wall of the apex cell perforations could be traced, which must have communicated with the substance of the sterno-cleido-mastoid muscle and the digastric fossa, respectively.

When all diseased bone had been removed and all pus tracks had been freely opened, I had before me a large cavity comprising the antrum, the groove of the lateral sinus, the digastric fossa, the substance of the parotid gland, and the substance of the sternomastoid muscle. The patient made an uninterrupted recovery, and the resulting scars are almost linear in form, and this may be due to the secondary closure of the wound attempted about two weeks after the principal operation.

A CASE OF ACUTE MASTOIDITIS (BEZOLD VARIETY), WITHOUT PERFORATION OF THE DRUM-MEMBRANE. OPERATION. RECOVERY.

By DR. ARNOLD H. KNAPP.

CASES of acute empyema of the mastoid process, with little or no apparent involvement of the middle ear, are uncommon; the following case presents some unusual features which may warrant its publication.

Mr. A. L., aged twenty-one years, applied for treatment at the New York Ophthalmic and Aural Institute on May 20, 1898, for loss of hearing and tinnitus in the left ear.

He is a man of medium build and rather poorly nourished. Family history negative. His previous health has been good, except that at the age of six he received an injury to his left hand, which was followed by "blood-poisoning," and required many months to heal. After measles, the hearing in the right ear was permanently impaired, though there never had been any otorrhœa. No symptoms of tuberculosis or syphilis. The present illness came on one week ago after a cold.

On examination: Left ear: conversational voice $\frac{8}{6}$, Rinne negative. The drum-membrane is intact, of normal color, and retracted. At its upper and posterior quadrant there is a slight prominence paler in color than the rest of the membrane, not tender, and without signs of an acute inflammation. After inflation, the hearing is improved. Mastoid region normal. Right ear: voice $\frac{8}{6}$. No high tones. Rinne negative. The drum-membrane is retracted and atrophic. No improvement after inflation. Nose and throat fairly normal. No pulmonary signs; no glandular enlargements. Irregular cicatrices on left hand and forearm.

The patient visited the clinic at intervals for six weeks. The hearing in the left ear, although it was at first improved by air inflation, grew gradually worse. The picture of the drum-membrane remained unchanged. The swelling at the upper and posterior quadrant persisted without ever showing any inflammatory signs. There never was any pain. In the night of July 15th the patient suddenly felt very severe pain in the region of the left ear. The area behind and below the ear became swollen and red; the pain continued to be very severe; the patient was prostrated and his temperature rose to 101° . On admission to the hospital, two days later, he presented the typical picture of an acute Bezold perforation, with torticollis and a painful swelling about the upper end of the sterno-mastoid. The entire mastoid region was tender. On otoscopic examination the appearance of the drum-membrane was unchanged; the same swelling at the upper and posterior quadrant, not continuous with the wall of the canal, and no signs of an acute inflammation. Temperature 101° . The patient was again examined thoroughly for any constitutional trouble, but with a negative result.

A free paracentesis was made into the prominent part of the membrana tympani; a minute quantity of bloody serum escaped. The patient was put to bed with an ice-cap on the ear. The symptoms were much relieved on the following day, but returned with renewed intensity on leaving off the ice. There never was any discharge from the paracentesis wound.

Operation, July 21st, under ether. The mastoid cortex was entirely removed; it appeared thickened, though otherwise normal. The mastoid cells were converted into one large cavity filled with pus, carious bone, and granulations. Pus could be seen issuing from a hole in the medial bony wall of mastoid, high up, directly beneath and in front of the antrum. A probe inserted in this opening led into a cavity covered externally by the mastoid tip and the sterno-mastoid muscle. The tendinous insertions were completely severed from the bone; the tip and the entire inner wall of the mastoid process to a line above the level of the perforation were removed, and the digastric fossa and styloid process exposed. The abscess cavity was thus freed of its bony walls. After careful curetting of the antrum the entire wound was packed with gauze. The soft parts closed in rapidly, and the wound was healed without any complication on September 1st. The hearing in the left ear returned quickly. On November

20th, left ear, whisper $\frac{1}{2}$ ft. Rinne positive. The swelling in the drum-membrane disappeared, and the drum-membrane was thickened and depressed.

REMARKS.—The unusual course of the disease in this case is, I think, due to the morbid process affecting a tympanum already more or less diseased, as evidenced by the retracted drum-membrane and the condition of the other ear. The present illness caused a chronic inflammatory exudate at the aditus ad antrum, with a distinct swelling at the upper and posterior quadrant of the drum-membrane, which never extended to the walls of the canal; the only subjective symptoms referable to the middle ear were loss of hearing and tinnitus. The membrana tympani never showed the signs of an acute inflammation. An extensive paracentesis was followed by no discharge whatever. The exact date of the mastoid involvement cannot be stated. No characteristic symptoms appeared prior to the perforation through the median wall of the mastoid, at least seven weeks after the onset of the illness. Several of these facts favor the possibility of the disease being of a dyscrasic nature. With this in view I examined the patient thoroughly a number of times, but always without result; in particular I may mention that diabetes was not present. The prompt healing after operation, the character of the pus, and the pathological changes found, confirmed the uncomplicated nature of the process.

As regards the operative treatment of a perforation through the inner wall of the mastoid process, the desirability of removing the tip and the medial bony wall of the mastoid to a point above the site of the perforation is evident. The entire abscess-cavity is thereby exposed, freed of any overhanging bony wall, permitting the collapse of the soft parts, and the ready dressing of the remote parts of the wound.

A PLEA FOR THE MORE ACCURATE DEFINITION OF TUNING-FORKS.

By J. ORNE GREEN, M.D., BOSTON, MASS.

THE tuning-fork has, of late years, become so important in tests of hearing, that a consideration of some of the difficulties encountered in understanding and comparing the tests of different observers is not out of place. While presenting absolutely nothing new, I venture to call attention to an old story easily forgotten and very generally ignored. The difficulties met with arise entirely from the different systems of notation used in different countries.

English	{	C	D	E	F	G	A	B
		bC ♯C	bD ♯D	bE ♯E	bF ♯F	bG ♯G	bA ♯A	bB ♯B
German	{	C	D	E	F	G	A	H
		bces ♯cis	bdes ♯dis	bces ♯eis	bfes ♯fis	bges ♯gis	baes ♯ais	bB ♯his

NAMES OF NOTES OF THE GAMUT.

French	ut	re	mi	fa	sol	la	si
Italian	do	re	mi	fa	sol	la	si

DESIGNATION OF THE DIFFERENT OCTAVES.

English and German	C _{..}	C ₁	C	c	c'	c''	c'''	c''''	c'''''
French	ut ₋₂	ut ₋₁	ut ₁	ut ₂	ut ₃	ut ₄	ut ₅	ut ₆	ut ₇

DESIGNATION OF THE OCTAVES SUGGESTED BY ZAHM.¹

C ₋₂	C ₋₁	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇
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In designating the number of vibrations, in France the so-called semivibration (*vibration single*, or v. s.) is used, while in Germany, England, and America, the full vibration (*vibration double*, or v. d.) is used. Among physicists some-

¹ *Sound and Music*, by Rev. J. A. Zahm, C.S.C., Chicago, Ill., 1892.

times the v. s. and sometimes the v. d. appears to be the favorite.

The tuning-fork for orchestras is A_3 of Zahm's notation.

The tuning-fork for pianos is C_4 of Zahm's notation.

The pitch of these forks varies very much.¹

Mersenne's A_3 (1648)	= 373.7	v. d.
Handel's A_3 (1751)	= 422.5	v. d.
Mozart's A_3 (1780)	= 421.6	v. d.
German Soc. of Physicists' A_3 (1834)	= 444.	v. d.
French Normal Diapason A_3 (1859)	= 435.	v. d.
French Standard A_3	= 435.45	v. d.
In England A_3 (1891)	= 454.7	v. d.
In New York A_3 (1891)	= 460.8	v. d.
Chickering Piano A_3 (1891)	= 451.7	v. d.
Steinway Piano A_3 (1891)	= 458.	v. d.
German Standard A_3	= 440.	v. d.
Physicists' A_3	= 426.6	v. d.
English Soc. of Arts, C_4	= 528.	v. d.
Modern Concert Pitch C_4	= 540.	v. d.
Physicists' C_4	= 512.	v. d.

This "physicists' C " = 512 v. d. is the old theoretical pitch, viz., the ninth power of 2, which was proposed by Sauveur and adopted by Chladni.

It gives vibrations as follows:

C_{-2}	C_{-1}	C_1	C_2	C_3	C_4	C_5	C_6	C_7
16	32	64	128	256	512	1024	2048	4096 v. d.

and is the standard adopted by most modern works on acoustics and should be the standard of all scientific acoustics.

A glance at the above facts shows how impossible it is for a writer to be accurately understood when he designates notes of the gamut, either by letters or names, or when he designates the octaves, unless he states what system he is using. In these days of close international intercourse it is not safe to assume even that the German necessarily uses the German system, or the Frenchman the French system. And even if an author does state what system he is using, his reader must be familiar with the various systems in use in different countries. Again, the number of vibrations of any given fork varies very much, so that even if the name of the note and the octave in which it lies is known, the

¹ *Op. cit.*

number of its vibrations is still an unknown quantity unless we know on what system it has been tuned. And still again, even if we know the number of vibrations, unless we are told that the enumeration is on the French or German system we cannot say whether the vibrations are single or double (v. s. or v. d.).

Recognizing this general confusion, the physicists have agreed upon the note C, giving five hundred and twelve double vibrations in the second, as the basis of their work, but, so far as I can learn, have not agreed upon any method of designating the octave in which the note lies, and we find it variously written as c'' , ut_4 , C_4 . Can anything be more illogical and liable to error in writing, reading, or ready comprehension, than the English and German method of designating the octave by a large C, a small c, a small c' with one stroke above the line, or a large $C_{..}$ with two strokes below the line, etc.?

Till some strong organization of influence enough to make itself generally felt has evolved order out of this chaos, it is in the interest of both authors and readers that any note to which reference is made should be described in full, and in no way, it seems to me, can this be done so succinctly as by giving the number of vibrations, and whether they are double or single, for example, fork 512 v. d., or C 1024 v. s., or F 682.4 v. d.

This is the more easily done as many of the manufacturers are now stamping their forks with the number of vibrations, and a still further advance will be made for international use when they will add, as some already do, to the enumeration of the vibrations the v. s. or v. d., which will then give the full description of the instrument. Whether v. d. or v. s. is used seems to me immaterial; probably each nation will continue the system now in common use: it is perfectly easy to multiply or divide by two if one wishes to reduce one system to the other.

By this method all doubt can be avoided; the author is spared the necessity of stating what system he is using, and the reader knows definitely and exactly what is meant.

ON CONGENITAL CLOSURE OF THE CHOANÆ.

BY DR. EUGENE JOËL, GOTHÄ.

Translated and Abridged by Dr. J. A. SPALDING, Portland, Me.

THE number of reported cases of congenital closure of the choanæ has increased largely since the detailed and instructive paper by Schwendt in 1889.¹ Heymann's recent text-book² has a more recent and comprehensive summary of the whole subject by Kayser.

All of the cases still later reported³ seem to be those of *typical* closure in the meaning of Schwendt, in which there is an actual congenital closure of the choanæ by bone, or membranous tissue, and not *atypical* or mere stenosis of the interior of the nose by extreme approximation of its walls, as described by Hopmann.⁴ In the same class may be included those by Baumgarten, of "False Closure."⁵

Kayser classifies the fifty cases so far reported as intranasal, marginal, and retronasal. In the first class he places those which lie a few *mm* inward from the choanal orifice, so that the mirror shows the actual margins of the choanæ; in the second, those which lie exactly in the choanæ; and in the third, those in which, owing to membranous formations between the velum and roof of the

¹ Graduating Thesis, Basel, 1889.

² *Handbuch d. Laryngol. u. Rhinologie*, Band iii., "Verwachsung der Nase."

³ Seven cases. Compare the original paper of Joël for literary references in the *Zeitsch. f. Ohr.*, vol. xxxiv., p. 25.—Transl.

⁴ "Ueber cong. knöcherne Verengerungen. u. Verschlüsse d. Choanen," Langenbeck's *Arch.*, Band xxxvii., Heft 2, 1888. And two cases of complete unilateral closure of the choanæ, *Arch. f. Laryngol.*, i., p. 359.

⁵ *Monats. f. Ohrenhikde.*, i., 1896.

pharynx, the choanæ cannot be seen by the rhinoscopic mirror.

The latter are not, in my opinion, to be considered as choanal contractions at all, but simply membranous formations in the naso-pharyngeal space simulating an actual closure.

In arranging these closures from a uniform point of view, we should consider whether they are unilateral or bilateral, complete or incomplete, bony or cuticular, or a combination of both. At present confusion prevails: for instance, Schwendt reports cases as bilateral, complete, and bony; Chiari, bilateral, imperfect, and membranous; Pluder, unilateral, total, and bony.

From my point of view, the annexed case should be entitled unilateral, complete, and mixed.

A lady of twenty-two consulted me in 1896 for long-standing nasal obstruction. She belonged to an apparently healthy family, and, according to her mother's statement, was not rachitic as a child, although the appearance of her upper jaw and the irregularity of her teeth seemed to suggest such a family trait. The two sides of her face were different, the left side flatter than the right, the palatal roof very high, the alveolar ridges prominent, and between them a very deep fissure almost like an inverted V, the whole appearance being different in every respect from that due to nasal breathing from adenoids in childhood.

The right nostril was unobstructed, but the left showed deviation and spur of the septum, swollen turbinates, and polypoid masses so that a deeper view was impossible. Rhinological examination showed no adenoids, but complete closure of the left choana by a pinkish membrane at the precise level of the choanal orifice. The tubal orifices were clear. Examination after cocaine-ization of the nostril, aided with digital naso-pharyngeal examination, proved complete closure on the left side.

Examination with a probe seemed to suggest, additionally, that the lower portion of the membranous formation was of an osseous nature, for a few *mm* above the floor of the nose, the upper portion being completely membranous.

The spur upon the nasal septum, the turbinates, and the polypi being got rid of by the cautery, the membranous portion of the obstruction in the left choana was then attacked with the galvano-

cautery and an opening made measuring about 2 by 1 *cm*, in an oblong ovoid, with the long axis vertical. I was unable to do anything with drainage tubes for maintaining open the artificial orifice, possibly owing to the very narrow canal. Such tubes suggested by Schwendt might work better in cases of bony atresia. With me they closed over at the end and slipped out of place. For that reason I relied on strips of gauze, and in a short time gained a permanent opening on the left side, a condition which has remained unchanged for the past two years, and the patient enjoys unobstructed nasal respiration.

The sense of smell, which before was quite defective on the left side, has now been considerably restored. The bony portion of the obstruction still remains *in situ*, but is not objectionable in the least.

MOVABLE SPONGY OSTEOMA OF THE CARTILAGINOUS PORTION OF THE EXTERNAL AUDITORY MEATUS.

BY DR. EULENSTEIN, FRANKFORT-ON-THE-MAIN.

Translated and Abridged by Dr. J. A. SPALDING, Portland, Me.

Mr. H., aged thirty-six, consulted me in April, 1898, for deafness of a week's standing in the right ear. He had never been deaf before, nor ever had suppuration from his ears, and had no idea of the cause of the present trouble. The tests for hearing showed extreme deafness of the right ear by aerial conduction, and examination of the meatus found it reduced to a minute slit, owing to the presence of a tumor covered with normal epidermis. The contracted orifice was full of cerumen, so that deeper examination was impossible. The tumor was immovable, and so painful to the touch that circumspection in the examination was needful.

The tumor was diagnosticated as an exostosis. After removal of the cerumen, by syringing, the hearing became nearly normal. A few days later the patient was attacked with erysipelas of the right auricle and neighboring parts, starting apparently from the meatus. This was treated at home, and I did not see the patient again until September, when deafness had again ensued in the right ear. When I attempted to loosen the accumulated cerumen with a probe, I found to my astonishment that the tumor was movable with a rotary motion, and with a delicate touch I succeeded in gradually making my way entirely around it, thus proving that it was probably pedunculated not far within the meatus. For that reason I doubted my former diagnosis, and proposed the removal with a snare, which could not, however, be accomplished, owing to the excessive pain produced by manipulation with the wire.

On renewing the attempt on the next day, the patient being anesthetized, the tumor was easily and fully removed, passing the contracted meatus with a smacking sound. Its insertion was seen in the cartilaginous portion of the meatus; the hemorrhage was insignificant, and the little wound was tamponed with iodoform and soon cicatrized. The hearing became normal, and in a few days examination of the interior of the passage failed to show any disease in the conducting apparatus.

The little tumor was the size of a large pea, had no actual pedicle, felt bony hard, and on division with a knife gave the sound of bone. Macroscopically it was a spongy mass, resembling medullated bone. Microscopically it was diagnosed as a typical exostosis with mucous medulla. The osseous trabeculae contained numerous osteoblasts. The tumor was covered with a cornifying, stratified epithelium. There was no actual pedicle, its locality being suggested by a spot without epithelium. The irregular bony trabeculae extended into the neighborhood of this spot, but did not attain the outer surface.

I have not been able to find a similar case in the literature accessible to me, but Delstanche has described one¹ in which the orifice was obturated by a broad, movable tumor, though the motility arose from softening due to pus-retention. Cocks's case² was one of bony metamorphosis of polypi in the course of chronic middle-ear suppuration. Then, again, Jacquemart speaks³ of a movable exostosis in the bony part of the meatus, and finally Lichtenberg⁴ mentions an osteoma of the cartilaginous portion, and asserts that it is the first on record.

I have no opinion to offer concerning the ætiology of this case. I am not positively sure that this tumor was immovable when I first saw it, but that proves nothing, because I had to be very gentle in my manipulation owing to the extreme sensitiveness of the patient. There are also mechanical considerations which may make a tumor filling the meatus seem immovable, as we often see in case of foreign bodies. It hardly seems worth while to refer the motility

¹ *Des Tumeurs Osseuses du Conduit Auditif*. Brussels, 1891.

² *Zeitsch. f. Ohrenhkd.*, Band xiii., p. 172.

³ *Rev. Mensuelle*, 1885.

⁴ *Rev. Laryngologique*, 1891, No. 19.

in the late stage to accidental rupture of the pedicle, as has occasionally been observed in cases of exostoses. For, the microscopic examination failed to define such a fracture, and if it had occurred from an accident, the pain within the ear could not have escaped the patient's notice. Possibly the erysipelas softened the original point of attachment.

The tumor, lying as it did in the cartilaginous portion of the meatus, cannot be regarded as an exostosis, because such a growth can only exist on underlying bone. For that reason I entitle it an *osteoma*, as Lichtenberg has done in his case previously mentioned.

A CONTRIBUTION TO DIPLACUSIS.

By DR. TEICHMANN, BERLIN.

Translated and Condensed by Dr. J. A. SPALDING, Portland, Me.

IF we understand by diplacusis, or double hearing, a functional alteration in which an objective tone is heard double, then all of those cases which have been called diplacusis binauralis, and distinguished by a tone being heard by one ear higher, lower, or later than by the other, must properly be called paracusis, or hearing differently. These affections occur transitorily during acute middle-ear inflammation, or permanently in chronic cases. But of genuine diplacusis, that is to say diplacusis in one ear, Gradenigo asserts that he has never been able to find a case in literature.¹ There is, however, a case which he cites² from Selm, which must be regarded as typical double hearing, for the C fork and the a¹ fork were perceived double in each ear by bone-conduction; and two others of his own: one in a woman with middle-ear inflammation who heard the forks c³, c⁴, and c⁵ double, by ærial conduction, some five seconds before they ceased to vibrate,—not being musical she could not tell the difference in pitch; and a second patient with double middle-ear catarrh, perceived in the second to the fourth-marked octaves higher and lower harmonic (third, fourth), both by air- and bone-conduction, as the fundamental tone died away.

In absence of other literary references I will now report my own personal experience.

¹ Vol. xxvii., p. 269. of these ARCHIVES contains a report of two cases published by Etiévant. Translated in the *Annales des mal. de l'or.*, No. 11, 1897.

² Gradenigo, "Krankheiten des Labyrinthes u. d. Nerv. acustic.," Schwartz's *Hand-Buch*, Bd. ii., 1893.

My hearing is good, and I have no recollection of suffering from any aural disease in childhood. A recent objective examination showed my ears in a normal condition. I am musical and I have a well attuned ear. Whilst making some tuning-fork tests a year ago, I made the following discoveries which remain the same to this date. When the fork c^4 is dying away before my ears, a few seconds before it ceases, I hear a second tone, a minor third below. The harder the fork is hit, the longer before I hear the second tone. When the fork is hit softly, I hear the second tone almost instantly. This minor third is less intense than the original, begins suddenly with a delicate buzzing, and dies away gradually with the original note. If I am at all nervous, the intensity of the second tone is increased. The longer I go on with my tests, the louder and the more distinct the perception. It occurs on both sides, but is not so powerful on the left as on the right. The relation of bone-conduction cannot be determined because with so high a subjective tone aerial conduction cannot be excluded. These sensations cannot be produced with any other forks, except that with $f^{\sharp 4}$ an indefinable buzzing is heard.

It is hardly worth objecting that my own forks may be defective in make, but I will mention that other persons have tested my forks and fail to hear double, and that on testing with similar forks belonging to other persons the same sensations are invariably perceived as above described.

In explanation of diplacusis I must agree with Gradenigo, that it is an abnormal increase of physiological processes (transmission of excitations, etc.), and originating in the labyrinth and nerve centres. I was at first inclined to regard it as purely central, as an abnormally facilitated transmission of irritation along frequently employed paths of association. The fact that when the fork is struck with greater force, the second tone is heard later than when the fork is struck gently, seems to argue against this view, because one would think that a stronger irritation would be the more easily transmitted of the two. The retardation, however, can be explained by the louder objective tone completely "covering," at first, the subjective tone. But in point of fact the second tone, even with a harder blow, is earlier heard *the farther the fork is held from the ear*.

I was soon to learn that diplacusis may depend on peripheral

causes. For, being detained by an accident one rather cool summer evening on the back seat of an open electric car in the open air, I felt a slight coldness in my right ear, and on reaching home a ringing and roaring in the same ear. The next day the ringing remained constant, and could not be altered either by closure of the meatus, pressure on the vessels of the neck, or by Valsalva. Most tones, and some voices, in the middle register felt disagreeable. The right ear was moderately deaf; could not, for instance, be used in telephoning. Perception was reduced for the c^1 and c^2 forks. Aërial conduction gave false tones: c^1 became $c^{\sharp 1}$, c^3 became $c^{\sharp 3}$; A^1 gave no tone but only a sound like a factory whistle; c^2 sounded like f^2 , but later in the day the subjective sound was like c^2 . The left ear remained normal.

On the next day the tinnitus was not so constant, but was perceived after coughing, or blowing the nose, or in a noisy street, and still pitched at c^2 ; the c^2 fork sounding dull but with a distinct overtone of f^2 . Later still the subjective tone became double, between h^1 and f^2 . Improvement came slowly, but even after several days the fork c^2 was accompanied with a double tone on e^2 in the right ear, as the ground tone died away.

In this case a peripheral irritation caused *diplacusis binauralis dysharmonica*. The double tone of the subjective note is worth emphasizing. The affection was probably rheumatic in its origin, with a doubtful localization. A purely middle-ear or tubal affection could be excluded by Weber's test and abbreviation of bone-conduction. A purely labyrinthine affection was excluded by normal perception of the c^2 fork by bone-conduction, false hearing by aërial conduction, and alterations in perception after the air bag. So that we are left to assume a combination of middle-ear and labyrinthine disease. I agree with Jacobson,¹ that false hearing cannot be explained by middle-ear alterations, and at all events my case proves that diplacusis may depend upon, or can at least be explained by, some peripheral affection.

LITERATURE.

1. GRADENIGO, "Die Krankheiten des Labyrinthes u. d. Nervus acusticus," SCHWARTZ's *Hand-Buch d. Ohrenhlkde.*, Bd. ii., 1893.
2. VAN SELM, *Zur Casuistik des Doppelthörens*. Inaug. Dissert., Berlin, 1889.
3. JACOBSON, *Lehrbuch d. Ohrenhlkde.*, 2te Aufl., 1898, pp. 86-90.

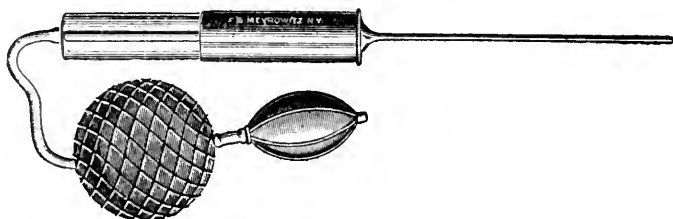
¹ *Lehrbuch d. Ohrenhlkde.*, 2te Aufl., 1898.

DRY AIR IN THE TREATMENT OF SUPPURATION OF THE MIDDLE EAR.

By JOSEPH A. ANDREWS, M.D., NEW YORK.

THE application of dry air in the treatment of suppuration of the middle ear has been attended with such favorable results in my hands that I wish others to know of the means employed in carrying out this form of treatment.

We know that a dry soil is unfavorable to the growth of bacteria. It is upon this knowledge that the dry-air treatment is based. It is, of course, not possible to dry the



middle ear in the same thorough manner as a bone cavity can be dried by similar means; but the apparatus figured above dries the middle ear more thoroughly than can be done by any other means known to me. The instrument employed is a modification of the one which I exhibited at a meeting of the American Otological Society several years ago, a modified form of which was figured in the *London Lancet*, Dec. 20, 1890. It was designed to apply powders to the middle ear. The present design is practically the same instrument, to which a wooden or glass handle has been added, to enable the surgeon to hold it while the cylinder is hot and in use. Absorbent cotton is placed into the cylin-

der to protect the drum cavity from particles of dust which may be in the bulb. The air is furnished by means of the double air-bulb (Lucae) used to operate the Paquelin thermocautery and is worked by the patient, thus leaving the operator's two hands free. The metal portion of the instrument is heated over a spirit lamp. The air is thus heated on its way through the metal cylinder. The air should always be tested before being blown into the ear, as it is sometimes too hot. The object of the long narrow canula attached to the cylinder is to enable the operator to direct the stream of air to different parts of the drum cavity while the latter is illuminated by means of the forehead mirror.

The instrument may also be used for blowing powder into the drum cavity. Of course this form of instrument is but a means to an end. It is not intended that it shall in any sense take the place of the proper means employed to destroy granulations, etc., in the drum cavity, which must be first destroyed and the ear thoroughly cleansed before the dry air is applied. I have employed this form of treatment for six years and I am convinced that it is a valuable aid in the treatment of suppuration of the middle ear. The dentist uses a somewhat similar instrument for the purpose of drying the tooth cavity preparatory to putting in the filling; the air in his instrument being heated as it passes over a platinum wire which is heated by electricity.

This instrument is manufactured by E. B. Meyrowitz, 104 East 23d Street, New York.

REPORT ON THE SECTION OF LARYNGOLOGY
AND OTOTOLOGY OF THE BRITISH MEDICAL
ASSOCIATION. ANNUAL MEETING, EDIN-
BURGH, 1898.

By LOGAN TURNER, M.B., F.R.C.S., ED., HON. SEC.
TO THE SECTION.

President : Dr. P. McBRIDE.

The President, after cordially welcoming the members to the Scottish capital, introduced the business of the Section in an address upon "The Expansion of Laryngology and Otology."

He dealt with the great increase in literary activity and commented on some of the most striking national peculiarities in the literature of these special subjects. The Anglo-Saxon writer, he considered, aimed at brevity, and tended to put on record the practical rather than the purely scientific and theoretical aspect of his subject. The German author, on the other hand, was eminently attentive to detail and had a strong tendency to discuss the subject from every possible point of view and not always in the fewest possible words. Some Germans have a tendency to polemic writing and at times even to personality. It must, however, be admitted that at the present time the best literature emanates from Germany. While much excellent work came from France, it appeared as if the amount of material did not quite justify the existence of all the journals which are devoted to these specialties in the French language.

Turning from national to individual characteristics, Dr. McBRIDE proceeded to say that the best type of author was he who had something new and valuable to communicate. A less praiseworthy type of writer was found in the specialist who magnified some new remedy, which often proved successful in the hands of

the inventor only, and again the same type was found in that man who, with a limited knowledge of general medical and surgical science, tended to magnify the importance of one special organ.

The subject selected for discussion was : **The Mutual Relationship and Relative Value of Experimental Research and Clinical Experience in Laryngology, Rhinology, and Otology.**

Sir FELIX SEMON (London) introduced the discussion in its bearing upon **laryngology**.

Dr. GREVILLE MACDONALD (London) continued the discussion in its **rhinological** aspect. The function of the nose in warming, moistening, and filtering the inspired air was surmised before any experimental investigation had been made in connection with it. Experiment, however, and laboratory investigation confirmed clinical observations. It was shown that the amount of moisture taken up by the inspired air varied (*a*) with the rapidity of the inspiratory act, (*b*) with the degree of patency of the nasal passages, and (*c*) with the degree of turgescence of the erectile tissue. This last fact was important in relation to pathological conditions of the erectile tissue, and further on account of the reckless manner in which the inferior turbinated bodies are condemned by certain rhinologists to the most ruthless eradication. Experimental investigation has shown further that a mucous membrane over which air passes shares to a considerable extent in the lung functions themselves. St. Clair Thomson and others have shown also the great filtering functions of the nose, which coincide with the remarkable tolerance that the nose exhibits towards abuse on the part of septic instruments and atmospheres teeming with organisms. Dr. MacDonald next referred to the nasal reflex phenomena, which were scarcely susceptible of physiological demonstration, and hence the study of their physiology from a clinical standpoint became more interesting. He concluded by saying that while physiological experiment was of help in clinical work, clinical observation helped even more in practical work, provided that we did not allow it to misguide us into physiological conclusions.

Dr. WILLIAM MILLIGAN (Manchester) next proceeded to show how much **otology** had benefited by research. He referred in the first place to the effects of experiment on the etiology and treatment of auditory furunculosis, and cited the experiments

of Löwenberg, who was able to produce furuncle by introducing staphylococci under the epidermis.

Turning next to suppurative diseases of the middle ear, he drew attention to the various organisms that might be met with in the tympanum: the staphylococcus albus et aureus, the streptococcus pyogenes, the pneumococcus of Fränkel, and the pneumobacillus of Friedländer. The streptococcus had been proved by careful bacteriological investigation to be the one most frequently met with in septic thrombosis, intracranial abscess, and septic infections of the pia-arachnoid. If the fluid, effused into the tympanic cavity in acute catarrhal conditions, is not at first purulent, as shown recently by Woods of Dublin, and if the organisms named are introduced from without through a ruptured membrane or after incision, then the indications for suitable and thorough antiseptic treatment of the external auditory meatus have been clearly laid down. In reference to this part of the subject, Dr. Milligan dealt with the discovery of the anti-streptococcic serum, and referred to the researches of Behring, Marmorek, Petruschky, Aronson, and Schenk in this field. His own experience went to show at the present time that the serum exerted very slight, if any, influence upon the course of acute streptococcal poisoning in man. Tubercular disease of the middle ear and its adnexa had been assisted, both in the way of diagnosis and treatment, through the results of experimental work. By inoculation experiments an infallible test was given us. The etiology of these cases of tubercular disease of the middle ear and the mode of entrance of the bacilli were points of considerable importance, and the question arose as to how far adenoid vegetations in the naso-pharynx might be the direct means of infecting the middle ear with tubercle through the Eustachian tubes. The researches of various workers into the presence of tubercle in adenoids were quoted, including a series of inoculation experiments made by the author himself, in which he had found 16.4 per cent. of the vegetations tuberculous. All these facts which had been quoted showed how close was the relation between experiment and our present knowledge of diseases of the ear.

Dr. Milligan proceeded to discuss in the next place how much had been learned of the functions of the internal ear from experiments; with regard to the central auditory apparatus, pathological observations supported experiment in *assigning to the left*

superior temporo-sphenoidal convolution the important rôle of cortical centre for audition, while clinical observations pointed to the existence of a definite connection between the cortical centre of the one side and the auditory organ of the other. Auditory function has, however, been assigned to other centres. The actual paths of communication between the cortical centres and the roots of the auditory nerves were as yet imperfectly understood.

An accurate knowledge of the topography of the brain was essential for localizing intracranial complications of middle-ear disease. An exact diagnosis of every complication was hardly possible, but in conclusion Dr. Milligan dealt with the diagnostic utility of lumbar puncture in determining the existence or non-existence of an accompanying meningitis in cases of mixed intracranial infections.

Dr. MIDDLEMAS HUNT (Liverpool): On the Relation of Fibrinous Rhinitis to Diphtheria.

Three cases were related, which presented the clinical characters of fibrinous rhinitis, but all of them were so allied to diphtheria as to make a diagnosis on clinical evidence alone a matter of distrust.

CASE 1.—A medical man with nasal obstruction and watery discharge for about a week. On examination, both nasal passages were found lined with a well formed, thick, white membrane, bleeding when torn off. There were no constitutional symptoms. Fibrinous rhinitis was diagnosed. Subsequently a membrane formed on the fauces and paralysis followed, rendering the diagnosis of diphtheria undoubted.

CASE 2.—A little girl showed the same symptoms and appearances as in the previous case, but the membrane was thinner and more friable; there was no fever, no albumin, and no glandular enlargement. Inoculations from the membrane were negative, and cultures showed only streptococci and staphylococci. Subsequent inquiry, however, showed that the patient had had "tonsillitis" a month or two before, followed by paralysis of the palate, and some other children associated with her had been laid up with sore throats.

CASE 3.—A little girl, with nasal obstruction and discharge from the left nostril, which had begun with a cold in the head eight weeks before. She never had sore throat during the eight weeks. On examination, a recent adhesion was seen between the anterior end of the left inferior turbinal and the septum, and

some patches of membrane were seen behind that. There were no enlarged glands, no albumin, and no paralysis. A servant in the same house had a sore throat, and was subsequently treated for diphtheritic paralysis. The week after the servant's illness, a brother of the little girl died from croup.

Summary:

1. While admitting that other bacteria besides the diphtheria bacillus may give rise to membranous exudation in the nasal passages, the vast majority of cases of fibrinous rhinitis are due to the Loeffler bacillus.

2. That it is impossible on clinical grounds alone to distinguish fibrinous rhinitis from mild nasal diphtheria.

3. That all cases of fibrinous rhinitis should be regarded as diphtheria until the contrary has been proved by reliable bacteriological investigation.

DR. L. H. PEGLER: An Operation for the Deformity Arising from Fracture of the Triangular Cartilage of the Nose.

There was present a depressed and sunken condition of the triangular cartilage, which together with the lateral cartilages was detached from the nasal bones. In the interior of the nose there was seen a prominent cartilaginous spur projecting into the left fossa, and the triangular cartilage appeared to have been split into two lateral portions.

The operation consisted in dissecting back the integuments from the nasal bones by a mesial dorsal incision. A stout silver wire was passed through the depressed cartilages from side to side, incorporating the two surfaces that appeared to have been separated, and taking care not to encroach upon the mucous cavities. The cartilage could now be raised by this wire. The second half of the operation consisted in sawing through the projecting angle of the nasal bones from above obliquely downwards and forwards until the cartilaginous articular surface was reached, and at this point the detached piece (consisting in reality of two portions, a larger on the right, chiefly cartilage, and a smaller, bony, on the left) was turned down and made to assist in filling up the hollow below. A hole was next drilled through the nasal bone, above the sawn surface, and one end of the wire which had been employed to perforate the triangular cartilage was carried through it. In this way gentle upward traction could be made upon the depressed portion, so as to cause it to regain to some

extent its old position. The ends of the wire were next brought together, twisted over the turned-down fragments of bone and cartilage, and trimmed so as to lie quite flat on the bridge. At the time of writing the case was going on favorably.

Dr. ST. CLAIR THOMSON (London): **Nasal Hydrorrhœa.**

The term Nasal Hydrorrhœa may still be preserved if it is used in a limited sense as defining an affection in which there is profuse watery discharge secreted by the nasal mucosa, and not dependent on intranasal or neighboring sources of irritation. The amount of the fluid may vary from what the patient would term a slight running, up to as much as a pint in the twenty-four hours. The clinical picture of nasal hydrorrhœa shades off in one direction into cases of what is generally called hay fever or paroxysmal rhinitis with symptoms of intense local irritation, while in the other direction they may consist of a passive and almost painless watery discharge from the nose. It appears to be an affection of adult life, occurring in both sexes; the flow usually takes place from both nostrils, though it may be more marked on one side than the other, and when handkerchiefs are soaked with it they generally dry stiff. It is most important to differentiate those cases in which the nasal watery flow is really an escape of cerebro-spinal fluid, and the discharge must be carefully examined in order to distinguish such from simple intranasal secretion.

Dr. CECIL E. SHAW (Belfast): **Case of Epithelioma of the Pharynx.**

Mrs. P., thirty-six years, was seen on May 19, 1897, complaining of difficulty in swallowing and a feeling of a lump in the throat. She was a well nourished woman. She had had no miscarriages, her family history was good. About March 1st of same year her throat began to feel sore, and at the end of April her voice became hoarse and she began to have difficulty in swallowing. At no time was there any pain. Examination revealed a dry and dirty pharynx; with the laryngeal mirror, a swelling about the size of a nut was seen on the posterior wall of the pharynx directly behind the epiglottis, which it touched; at this point the swelling was ulcerated. There were no enlarged glands. Antisyphilitic treatment was administered. The patient was not again seen by Dr. Shaw, but the history given was, that hemorrhage occurred from the growth, that she gradually became weaker, and that though no new symptoms developed she became comatose on July 9th and died.

Microscopic examination showed the growth to be an epithelioma; the age of the patient and the absence of pain were features of interest.

In the *discussion* which followed, Dr. McBride, Sir Felix Semon, and Dr. Milligan referred to the question of the presence or absence of pain in these cases. Either was possible. The cause of the pain, Sir Felix Semon thought, lay in the implication of the sensory nerves by the pathological process. The President, Dr. Dundas Grant, and Professor Urban Pritchard commented upon the importance of digital examination in such cases.

Dr. THOMAS BARR (Glasgow): **Notes on Extradural Suppuration in the Sigmoid Fossa Due to Ear Disease.**

Three cases were recorded in which a *firm wall of bone intervened between the middle-ear cavities and the abscess cavity.*

In the *first case*, after the opening and curetting of the mastoid antrum, pain continued, with repeated rigors, high temperatures, and remissions. There was no swelling or tenderness over the internal jugular vein. The sigmoid sinus was exposed by a second operation; after removing the sclerosed bone that lay behind the antrum, foetid pus and granulation tissue were found and the sinus covered with plastic exudation; the sinus being soft and elastic was not opened. The patient made a good recovery.

In the *second case*, there was a history of severe pain, and vomiting and one severe rigor after admission to hospital. Stacke's operation was performed. There was no tenderness or swelling over the internal jugular vein, but rigors continued, necessitating further operation. The bone was removed behind the antrum and the sigmoid groove was found to contain foetid pus, and further a quantity of granulation tissue was found between the bone and the dura, above and behind the sinus. This was curetted. The patient made an excellent recovery.

The *third case* belonged to the pre-operation period, and post-mortem showed a state of things almost identical with the above. With a history of chronic middle-ear suppuration, the patient was seized with great pain, followed by vomiting, rigors, coma, and death. There was found post-mortem a collection of foetid pus in contact with the inner surface of the mastoid process and posterior surface of the petrous bone on the left side. The walls of the lateral sinus were separated from the bone by the pus. There was no pus in the sinus. There was no meningitis or cerebritis.

The points of interest were: the rigors and high temperature, with

an absence of pain, swelling, or cording of the internal jugular vein. There was no evidence to show that the sinus was plugged, and in the two cases operated on recovery took place without opening the sigmoid sinus. By removing the septic matter covering the sinus further absorption was prevented. Where rigors and high temperature existed, the antrum should be opened and the dura mater exposed in one operation, or the second part of the operation should be performed very soon after the first if no decided improvement took place in the meanwhile. Such rigors and high temperature were not possible with an affection confined to the middle ear.

Dr. THOMAS BARR (Glasgow): A Case of Double Acute Mastoid Empyema with Exposure of Dura Mater. Operation in Both.

In this case, when the mastoid antrum was opened, the sigmoid sinus and neighboring dura mater were found already exposed, covered with granulation tissue and bathed in pus. The patient, an adult male, forty-six years, gave a history of ear suppuration of three weeks' standing. The temperature was normal and there were no rigors. Owing to the continued profuse discharge and pain on pressure over the mastoid antrum, the right ear was operated on and a large cavity containing pus and granulation tissue was opened into, while the sigmoid sinus and neighboring dura were found exposed on the back wall. After curetting, etc., healing and closure of the cavity followed. Three weeks later, the left ear was operated upon; a similar condition was found, but the sigmoid sinus was not exposed. Recovery took place.

Here there was an entire absence of rigors and high temperature. Notwithstanding the amount of local inflammatory mischief, no systemic infection had taken place. There was comparative absence of pain, though there was extensive otitis and destruction of tissue.

Mr. HUGH E. JONES (Liverpool): Some Unmanageable Complications of Suppurative Middle-Ear Disease.

The complications are described as unmanageable in a relative sense only; a successful result might have been obtained in some of the cases recorded in certain contingencies. The notes of seven fatal cases are recorded. The author's conclusions were that:

1. None of these cases had received treatment by a specialist for the ear affection.
2. In most of the cases serious delays occurred before surgical

treatment was sought. The first thrombosis case had an unopened mastoid abscess for two weeks before admission. The temporo-sphenoidal case had been seriously ill for four weeks before he was seen by the writer. The caries of the petrous case had swelling over the mastoid and in the neck three weeks before it was sent in for operation. The suppurative meningitis cases were sent in as soon as the complication manifested itself, but evidence of very serious ear mischief had been present for some weeks.

3. *Extension of the suppuration beyond the limit of successful operative treatment.* Whether this was due to the rapidity of the process or to avoidable delays in applying proper treatment, it was the cause of failure in the thrombosis cases, in the temporo-sphenoidal case, and in the cases of purulent meningitis.

4. *Failure to expose the fatal lesion.* This caused death in the cerebellar case, either by actually bursting the abscess without providing an exit for the pus, or by spontaneous bursting of the abscess after the operation. The occurrence of meningitis in the caries of the petrous case would possibly have been prevented by a most extensive and thorough exposure of the diseased area. Once a general suppurative meningitis has been set up all operations fail.

The moral seemed to be that the most important study of all in connection with this subject was the early detection of suppuration in the attic and antrum or internal ear, whether in chronic or acute suppurative otitis, and *more especially in the latter*, in which the mischief spreads with much greater rapidity.

In the *discussion* on the papers read by Dr. Barr and Mr. Jones it was stated by Dr. Dundas Grant that he was in favor of early opening of the mastoid with symptoms in acute middle-ear suppuration. His experience led him to reduce the interval to within a few days after paracentesis. If the symptoms recurred or there was the slightest evidence of acute inflammation of the mastoid, one should open at once, as the results were so satisfactory when the operation was performed at this stage.

Mr. T. MARK HOVELL (London): **Catheterization of the Eustachian Tubes.**

Mr. Hovell dwelt upon the absence of uniformity with regard to gauge and length of curve of the catheter as represented by a particular number, and also upon the variability in the length of its stem. At the present time there existed no nomenclature

which enabled one practitioner to tell another the precise gauge and curve of a catheter required for the treatment of a particular case. He submitted :

1. That the gauge of Eustachian catheters shall be that of the French catheter gauge, which is well known and graduated on a definite scale.

2. That the length of the curve shall be expressed in millimetres, the number indicating the distance which the curve separates two parallel straight lines. Thus when a catheter is placed so that the outer part of the stem touches the one line, and the tip of its beak the other line, the distance between the two lines shall indicate the curve in millimetres. As the beak of a catheter is usually slightly larger than the stem, the actual gauge of the latter will be a trifle less than the number specified. It was suggested that good work could be done by the general practitioner with the following three instruments :

No. 9 gauge, 18 millimetres curve.

No. 7 " 16 " "

No. 5 " 14 " "

In *discussing* Mr. Hovell's suggestion, the speakers agreed upon the utility of a uniform standard. [Dr. McBride and Dr. Walker Downie said that another line was necessary in the drawing of the scale which Mr. Hovell had submitted to them.]

Mr. LENTHAL CHEATLE (London) : **Specimen of Sarcoma of the Middle Ear.**

Specimen of the tumor with photographs was shown from a child two and a half years. On May 4, 1896, there was present a large, diffuse, fluctuating, painful swelling behind the left pinna. A tough, pedunculated polypus filled the external auditory meatus. There was a history of discharge from the ears for some months. The swelling was opened, and pus, granulations, and ulceration of bone were found ; there was a communication with the mastoid antrum. This condition was dealt with.

On August 17, 1896, the child was readmitted to hospital. At that date there was left facial paralysis, and behind the auricle there was a sessile, red, offensive, fungating mass, about the size of a small orange ; the tumor passed down into the upper region of the neck ; there was optic neuritis. The tumor grew rapidly and the patient died on October 19th. Post-mortem revealed the tumor involving the deep glands of the neck ; through an opening in the temporal bone, which involved the mastoid and lower

squamous regions and the roof of the middle ear, the growth spread into the middle fossa of the skull as a rounded, lobulated mass. Over the intracranial surface of the growth the dura mater was lost, and the overlying temporo-sphenoidal lobe was indented. The microscope showed that it consisted chiefly of small spindle cells.

DR. WILLIAM MILLIGAN (Manchester): Some Observations upon Antrectomy as a Means of Treatment in Suppurative Middle-Ear Disease.

In acute suppurative conditions characterized by such general symptoms as high temperature, rapid pulse, headache, etc., there is a most important indication of pus within the mastoid cells, in the presence of local pain over the process, frequently most exquisite, and in the presence of an œdematous swelling of the postero-superior meatal wall—"the dip"—close to its attachment to the membrana tympani. The persistence of such general symptoms, in conjunction with severe local pain, dipping of the postero-superior meatal wall, and the presence of discharge, whether copious or not, should at once determine operative procedure.

Cases which may fairly be called subacute exist, which have run a course of a few months, in which the discharge is fairly free, and in which the sense of hearing is distinctly and progressively becoming worse, and in which, owing to the absence of all tension, pain is absent. Rational local treatment may be carried out for too long a period in such cases, and the resulting damage to the ear and hearing power becomes worse. So long as there is no pain, there is a tendency to discountenance any idea of operation, and to continue the local treatment for almost indefinite periods. To regard the presence of pain as a *sine qua non* to the performance of a mastoid operation is to do an injustice to the patient, because suppuration continues, and more and more disorganization of the middle ear results. To determine the presence of pus in the mastoid antrum or cells is often difficult. Experience has shown that, if the middle ear be cleansed first by syringing, secondly by free inflation with Politzer's bag, and if pus still reappears almost immediately after drying and redrying of the part, there must be a reservoir of secretion, not simply in the middle ear itself, but in the cavity of the mastoid antrum or cells. Operative experience has endorsed this view.

A point of some diagnostic value is the surface temperature of

the skin over the posterior meatal wall, close to its attachment to the membrane, in contrast to the surface temperature taken over a similar area upon the anterior meatal wall. In cases where pus is present in the mastoid cells, or where the mucous membrane lining these cells is in hyperæmic condition, the surface temperature of the posterior wall will be found slightly higher than that of the anterior. This, with the other facts mentioned, should point strongly to the conclusion that the tissues within the mastoid are in an unhealthy condition and require free exposure. An exploratory mastoid operation might be done more frequently and at an earlier date than is at present the custom. In the subacute variety such an exploratory operation is advisable. In chronic suppuration,—in cases which have run a course of perhaps a few years,—there is, as a rule, some bone lesion superadded. This may be recognized by inspection, or by palpation with the probe, but it may be situated in the depths of the mastoid antrum or cells. Should purely local treatment be countenanced for indefinite periods? In these cases there is an inherent element of danger, and serious intracranial trouble may suddenly supervene. The absence of pain has largely determined a non-operative course of treatment, and radical measures have frequently been delayed, until the supervention of pain has only been the immediate precursor of a fatal meningitis, etc.

If suppuration has persisted for twelve months, and if for at least three months careful and rational local treatment has been tried without avail, then the mastoid antrum and cells should be opened and cleared out, the operation being determined by the peculiarity of each individual case. If cases proved to be of tuberculous origin, early opening and drainage should be resorted to; where cholesteatomatous masses occupy the attic and antrum, an early and radical operation should be carried out, and a permanent mastoid fistula maintained.

Of 150 cases operated upon, and forming the basis for these remarks, 10 were acute, 10 were subacute, 102 were generally chronic, 18 were of tuberculous origin, and in 10 cholesteatomatous masses were present.

All the acute cases healed rapidly with recovery of hearing power. Of the subacute cases, 9 entirely recovered, the hearing power returning to practically the normal amount, and 1 was lost sight of. Of the chronic cases, 78 were operated upon by a modified Stacke, and 65 of these completely recovered, 1 died, and 12 were lost sight of.

In 72 cases the ordinary Schwartze operation was performed. Of these 47 recovered, 8 died, and 17 were lost sight of or were still under treatment.

The 18 tuberculous cases were at once submitted to operation : 9 recovered, 6 died, and in 3 the subsequent history was unknown ; 3 died from meningitis, 1 from tuberculous enteritis, and 2 from general marasmus.

Of the 10 cases with cholesteatoma : all recovered, 5 with a permanent mastoid fistula ; in 1 the cavity was allowed to granulate from the bottom, while in 4 Stacke's operation was performed.

HAMILTON A. BALLANCE (Norwich) : A Case of Septic Thrombosis of the Lateral Sinus.

A woman, aged twenty-four years, pregnant five months, was admitted to the hospital suffering from disease of the left tympanum and mastoid for many months. There had been no discharge from the ear until one week before admission. She had had repeated rigors, sickness, and headaches. There was double optic neuritis.

A complete mastoid operation was done, an extradural abscess opened, and a slough removed from the lateral sinus. The internal jugular vein was divided between two ligatures in the neck. Suppurative tonsillitis, jaundice, and two attacks of erysipelas also occurred. The patient completely recovered.

DUNDAS GRANT, M.A., M.D., F.R.C.S. : Mechanical Vibration Applied to the Spine in the Treatment of Sclerosis of the Middle Ear.

By means of an electric motor, vibration is applied to the spine between the shoulders for five minutes at a sitting. The patient is usually able to realize after one application whether benefit has occurred. Ten cases were related, in six of which more or less improvement in deafness and tinnitus resulted.

If improvement occurs at the first sitting the vibration is applied daily for one week, and is then diminished in frequency to the minimum necessary to maintain the effect. Dr. Grant believes that the beneficial action is due to an indirect massage of the stapedio-vestibular joint.

PHYSIOLOGICAL SECTION OF THE BRITISH MEDICAL ASSOCIATION.

Dr. RUTHERFORD, Professor of Physiology, Edinburgh : On Tone-Sensation, with Special Reference to the Function of the Cochlea.

After giving a short description of the structure of the cochlea, Professor Rutherford continued :

The sound wave in its phase of condensation passes through the foot-plate of the stapes into the scala tympani, and is transmitted through Reissner's membrane to the fluid of the cochlear canal and its contents, and through the basilar membrane to the fluid in the scala vestibuli and the membrane of the round window. All these parts oscillate back again in the rarefaction phase of the wave. It is admitted that the wave strikes Corti's organ in its whole length practically at the same moment, and there it is translated into that unknown form of molecular vibration termed a nerve impulse.

Our auditory sense can distinguish tones varying from 16 (double) vibrations to 60,000 per second. According to Helmholtz, Corti's pillars or the fibres of the basilar membrane will co-vibrate and transmit the excitation to the auditory nerve. The higher tones are taken up by the fibres of the first turn, the lower by those of the third, the fibres increasing in length gradually from the base near the fenestra ovalis to the apex, from about 0.2 mm to 0.3 mm.

In 1880, Rutherford, on account of the great difficulties which beset the *resonance theory* of Helmholtz, advanced the so-called *telephone theory* of hearing, in order better to understand the action of the cochlea. The telephone transforms sound vibrations, however complex, into electrical currents of corresponding frequency, amplitude, and wave-form, and these in turn are re-transformed into sound vibrations similar to those received. The cochlea, according to Rutherford, may not be the place where sound is analyzed, but the auditory centre. He mentions, to support his theory, especially the investigations of Hermann¹ on the production of differential tones. When two discordant tones are simultaneously produced, a beat is heard, and if the vibrational difference between the two primary tones is sufficiently great, the successive beats give rise to the sensation of a third tone whose pitch is the vibrational difference between the two primary tones ; for example, if the primary tones have respectively 440 and 528 double vibrations, viz., the notes a¹ and c², the pitch of the beat-tone is 88 d. vibr., i. e., the tone F.

¹ Hermann, "Zur Theorie der Combinationstöne," *Pflüger's Arch.*, 1891, xlix., p. 499.

Hermann produced the two primary tones from two tuning-forks, with a third fork at rest but capable of consonating to the beat-tone if it had been produced objectively. The third fork remained unaffected, although the observer heard the beat-tone distinctly. He therefore concluded that if the beat-tone failed to excite a resonator outside the ear it could not affect any supposed resonator in the cochlea; consequently it must be a purely subjective phenomenon arising from the conflict of vibrations in the auditory centre. That experiment—which is fully confirmed—proves that the auditory nerve transmits to the sensorium vibrations of the same frequency as the sound waves, and that they produce in the auditory centre harmony or discord according to their relative numbers. Hermann's conclusion from these experiments is "that there is no alternative but to drop the Helmholtz theory of resonators in the ear, although so elegant."

Rutherford is not unaware that "his theory still leaves much that is in the highest degree obscure." He speaks of the value of the Galton whistle, of the pressure-pattern theory of A. Waller,¹ Baginsky's experiments on animals, and the pathological observations on man, by Stepanow, Gruber, Moos and Steinbrügge, Burnett, and Bezold. Regarding the investigations of Bezold he mentions only the earlier examinations of this author, not the recent so important ones with the continuous tone-series on deaf-mutes and patients with partial exfoliation of the cochlea in one ear.

H. K.

¹ *Human Physiology*, third edition, 1896, p. 474.

REPORT OF THE PROGRESS IN OTOLOGY FOR THE THIRD QUARTER OF THE YEAR 1898.

ARRANGED BY DR. A. HARTMANN.

Translated by Dr. ARNOLD H. KNAPP.

ANATOMY OF THE EAR.

186. BROMAN, J. The development of the auditory ossicles in man. *Proceedings of Anatomical Society* at the XIIth Congress at Kiel from 17-20 August, 1898.

187. MORRIL, A. D. The innervation of the auditory epithelium of *Mustelus canis*. *Journal of Morphology*, vol. xxiv., No. 1.

188. GRUNERT, C. The origin of the fistula auris and auricularis congenita. *Arch. f. Ohrenheilk.*, vol. xlv., p. 10.

186. Malleus and incus are derivatives of the mandibular arch, while the stapes is developed entirely from the hyoid arch. The stapelial process sinks into the labyrinthine wall and the fenestra ovalis results by pressure-atrophy. Ossification of the stapes starts in the fœtus of 21 *cm* from a centre at the base. Ossification of the incus commences in the fœtus of 19 *cm* at the upper part of the long process. The malleus begins to ossify at about the same time; there is but one centre, situated in the neck.

KRAUSE.

187. MORRIL examined the nerve-terminals in the ampullæ of the shark's labyrinth with Ehrlich's methylene-blue. The filaments either end freely between the hair-cells, or they touch the lower end of those cells with a terminal head. A direct connection between the hair-cells and the nerve-filament could not be found.

KRAUSE.

PHYSIOLOGY OF THE EAR.

189. VOHSEN. On the sense of hearing. *Report of the Senckenberg Society in Frankfurt-a.-M.*, 1898.

189. VONSEN explains the very delicate and exactly differentiated auditory sense by the importance of its most important function, the interpretation of speech. He compares the hearing and speaking organs of the animal kingdom in a table, and shows that the degree of development of the hearing organ corresponds to the structure of the voice. The relations of the auditory organ to equilibration, the hearing power, and sound-conduction are discussed, together with experiments and Helmholtz's hypothesis. Finally, the importance of the examination of hearing, especially with the voice and the continuous tone-series, is dwelt upon.

BRÜHL.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

190. GERBER, H. Contributions to rhino-laryngology and otology. *Monats. f. Ohrenheilk.*, No. 7, 1898.

191. EITELBERG, A. General examination of the patient. *Wiener medic. Presse*, No. 39, 1898.

190. GERBER reports one death among 458 anæsthesias in a scrofulous child with a weak heart. In the after-treatment of operations on the septum a modification of Winckler's splint, one in which the handle has been removed, is recommended. In 80 cases of opening of the maxillary antra, 1 was cured in four weeks, several in six months to a year, the majority after two or more years. Some have remained in treatment after four to five years. Gerber cannot agree with Kuhnt that the removal of the anterior wall of the frontal sinus is not followed by deformity.

In leukoplacia and the various ulcerations of the tongue, chromic acid is very serviceable.

Adenoid vegetations are removed in superficial narcosis with Juracz's forceps, Gottstein's curette, and Hartmann's curette in turn. Finally the naso-pharynx is examined with the finger. Several cases of otitis followed the operation.

As regards the chronic purulent otitides, Gerber favors the conservative treatment.

The etiology of ozæna is not always the same. Hereditary and dyscrasic influences, acute and chronic infectious diseases which cause an atrophy of the mucous membrane and the framework, and changes in the epithelium may act as causes. Diphtheria bacilli were always found in cases of rhinitis fibrinosa; in one case the infection of a second individual was proven. Rarer cases

included a tuberculoma of the lobule, four cases of rhino-scleroma, and some unusual tumors of the septum. Rhinoliths were usually composed of leptothrix and other bacteria. KILLIAN.

191. EITELBERG believes that the disposition to affections of the naso-pharynx leading to aural catarrh is inherited, and that individuals with narrow noses are most liable. POLLAK.

b.—METHODS OF EXAMINATION AND TREATMENT.

192. TREITEL. Hearing exercises and their value in deaf-mutes and the very deaf. *Klin. Vorträge*, vol. ii., 11, 1898.

193. OSTMANN. On massage of the ear, 2d part. The action of the massage apparatus on the normal sound-conveying part of the ear. *Arch. f. Ohrenheilk.*, vol. xlv., p. 39.

194. LÖHNBERG. An instrument for vibratory massage of the drum-membrane and of the nasal mucous membrane for the patient's own use. *Monatschr. f. Ohrenheilk.*, No. 8, 1898.

195. KYLE, D. BRADEN. The position of the orifice of the Eustachian tube and the possibility of catheterizing it through the mouth. *Philadelphia Med. Jour.*, Sept. 24, 1898.

196. SINGER, A. On the inhalation of sal-ammoniac. *Wiener med. Presse*, Nos. 38 and 39, 1898.

192. After an historical review of hearing exercises for deaf-mutes, Urbantschitsch's method is described, and to judge of its worth the following questions are put: 1. Is it possible to restore lost hearing or to improve hardness of hearing? 2. Do these exercises possess a practical value for the enunciation of deaf-mutes and further for the intercourse with those of normal hearing?

The answer to Question 1 is, No. Autopsies of deaf-mutes have shown irreparable conditions in the labyrinth, and examinations with tuning-forks could not detect an essential increase of hearing even in those deaf-mutes treated with hearing exercises. It is, however, possible with hearing exercises to increase the understanding of deaf-mutes from words to sentences—neglecting tactile sensations,—especially when psychical combination processes are present; a proof for this is a loss of the results with cessation of the hearing exercises. In the psychically deaf, hearing exercises may restore the hearing, and in children with late acquired deafness, hearing remnants may be preserved. They may be tried in adults with functional disturbance of hearing.

Question 2 is answered by stating that the enunciation is not

improved by hearing exercises, and the improved hearing is not sufficient to allow of conversation. The author therefore concludes (perhaps too hastily) that hearing exercises cannot be recommended as a part of the general exercise for deaf-mutes.

BRÜHL.

195. After giving an account of the use of the Eustachian catheter since the earliest times, KYLE refers to catheterization of the tube through the mouth, and gives cuts of several catheters devised for this purpose.

The catheter used for this purpose by the author is of coin silver, six inches in length, and very flexible, so that the curve can be altered at will to suit individual cases. Attached to the catheter is a small receptacle in which may be placed medicinal agents to be injected into the ear. The patient holds the tongue down with a tongue depressor while the surgeon locates the position of the tube with a mirror held in one hand, and with the other introduces the catheter behind the uvula. The author prefers this method to catheterization through the nose, for the following reasons: It is difficult and often impossible to pass the catheter through the nose, when there are deviation or spurs of the septum, thickening of the inferior turbinate bone, malformations, etc. The catheter can be introduced directly into the Eustachian orifice in an aseptic condition.

GORHAM BACON.

196. SINGER describes Urbantschitsch's modification of Kerr's inhaler. This apparatus has done good service in the hands of the reviewer.

POLLAK.

EXTERNAL EAR.

197. BRUYS. Herpetiform eruption on the auricle preceded by severe constitutional symptoms. *Bull. de la soc. belge d'ot., de lar.*, 1898.

198. COURTADE. Acquired and congenital occlusions of the auditory canal. *Ann. des mal. de l'or., du lar.*, xxiv., 7.

199. MCBRIDE, P., and TURNER, LOGAN. Tumors of the external auditory meatus. *Edinburgh Hospital Reports*, vol. v.

200. STANKOWSKI. Bilateral rupture of the drum-membrane. *Monatschrift f. Ohrenheilk.*, No. 8, 1898.

201. FINK, EMANUEL. On foreign bodies in the ear. *Deutsche med. Wochenschr.*, No. 27, 1898.

202. GANDIER, M. A foreign body wedged in the middle ear. *Bull. de la soc. belge d'ot., de lar.*, 1898.

197. A girl of thirteen was suddenly taken ill with violent constitutional symptoms, great pain over the mastoid, diminished hearing, but without fever; four days later an eruption of herpetiform vesicles appeared. The vesicles were situated in the area supplied by the auricular nerve, hence BRUYS believes it to have been a case of herpes zoster. ZIMMERMANN.

198. In one case, after the entrance of potash lye in the right ear, the auditory canal became completely occluded after three months without otorrhœa, but patient noticed that pus escaped into the pharynx. The cicatrix was divided and kept open with a drainage tube. There was an oval perforation in the drum-membrane.

The other three cases were not treated operatively. In two, the occlusion was the consequence of an inveterate otorrhœa. In the third, a man of twenty-nine, there was a congenital defect of the auricle with rudimentary ridges under the skin, and a blind duct 4 *mm* deep which from time to time discharged plug-like masses. ZIMMERMANN.

199. CASE 1. A warty sessile mass growing from the skin covering the upper and back part of the cartilaginous meatus, bleeding readily when touched with the probe. Microscopical sections showed it to be a simple papilloma. In a man aged twenty-nine years.

CASE 2. On the posterior aspect of the tragus, and attached to its inner half, was a small tumor about the size of a bean, covered by the hairy skin and filling up the lower half of the auditory meatus, slightly pedunculated, and of firm consistence. Microscopic sections showed mainly bundles of fibrous tissue with the cells lying between, and blood-vessels scattered here and there. Numerous sebaceous glands considerably in excess of the normal were also seen, the whole being covered by a thin layer of epithelium. In a woman aged twenty-nine years.

ARTHUR CHEATLE.

200. Report of three cases of bilateral rupture of the drum-membrane: one the result of explosion of the water-level of a boiler; the others following boxes on the ears. The literature of the subject is reviewed. KILLIAN.

201. A farmer, twenty-eight years of age, carried a completely occluding pea in his ear-canal for twenty-one years. After extraction of the pea, a fairly well-preserved cockroach was found in the depth of the canal. *Not* normal.

The second patient has suffered from an old otorrhœa and recently from pain in the ear. Twenty maggots, each 1 cm long, were extracted. Some of these worms had found their way into the patient's throat and were then expectorated.

NOLTENIUS.

202. The foreign body, a hook from a lace boot, had been forced into the tympanum by two surgeons during attempts at extraction, and caused a large abscess, facial paralysis, and mastoid empyema. The foreign body was detected by means of the X-rays, and at the operation was found lodged in the aditus. Recovery.

ZIMMERMANN.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

203. PONTIÈRE. Facial paralysis during an acute otitis media. Recovery. *Ann. des mal. de l'or., du lar.*, xxiv., 8.

204. CHEATHAM, WILLIAM. Some of the special germs in inflammation of the middle ear, with an interesting case. *New York Medical Record*, Oct. 1, 1898.

205. SPRAGUE, FRANK B. Remarks on some dangers attending an acute suppuration of the middle ear, with three illustrative cases. *Atlantic Med. Weekly*, July 30, 1898.

206. HEERMANN, G. On otitis media in early childhood (otitis comitans). K. Marhold, Halle, 1898.

203. This is a good example of the rare occurrence of facial paralysis in the course of acute otitis. The paresis disappeared in a week, hence it was probably caused by compression from an exudate and not a neuritis. As regards the crooked position of the uvula, PONTIÈRE shares the opinion of Lermoyez that the soft palate is not innervated by the facial. ZIMMERMANN.

204. The case was one of acute suppurative inflammation of both middle ears, resulting in attic disease on the left side. The pus burrowed through externally about on a level with the superior edge of the external auditory canal posteriorly. A free incision was made and drainage established. The patient recovered. The point of interest was the presence of a pure culture of the diplococcus of Weichselbaum. The disease started as an acute tonsillitis in which there was also a pure culture of this diplococcus. GORHAM BACON.

205. The first case reported was that of a male, aged forty-two,

who had an acute purulent otitis media followed by caries of the mastoid, cervical abscess, and septicæmia. Duration of illness three months. Recovery.

CASE 2. Male, aged twenty-seven, had severe inflammation of the right ear followed by a free discharge. There developed infective thrombosis of the right sigmoid sinus, an extradural abscess, and multiple metastatic abscesses, and pyæmia. An operation was performed, but death followed eighteen days later.

The third case was that of a male, seventy-four years of age, who had an extradural abscess, necrosis of the entire mastoid portion of the temporal bone, due to an acute purulent otitis media. Illness of two weeks' duration. An operation was performed which was followed by recovery. GORHAM BACON.

206. After reviewing the papers which have appeared on this subject, HEERMANN describes nine autopsies of children who had not previously been examined. He concludes as follows:

1. Otitis media in early childhood develops with a severe general diseased condition as an otitis comitans.

2. It is to be regarded as a complication of the general disease, causing no symptoms nor influencing the course of the general sickness.

3. Its bacteria are to be found in the normal Eustachian tube and middle ear. The weakened constitution gives the necessary nidus to their growth.

4. In certain cases this otitis comitans appears as a severe complication and cannot be distinguished from the genuine otitis media.

5. The otitis comitans requires no treatment, unless acute symptoms supervene, which are then to be treated like the usual otitis.

6. In the treatment of this severer form, as in the genuine otitis, irrigation of the ear-canal is by no means permissible.

H.

b.—CHRONIC OTITIS MEDIA.

207. KREBS. The indications for the radical operation of chronic purulent otitis. *Monatschr. f. Ohrenheilk.*, No. 9, 1898.

208. PRITCHARD, URBAN. Changes in the stapes and incus joint due to chronic middle-ear suppuration. *King's College Hospital Reports*, 1897.

209. BOTLEY, R. Three cases of attico-antrectomy with a simplified plastic procedure. *Arch. f. Ohrenhilk.*, vol. xlv., p. 68.

210. LOMBARD. The electric borer and drill in mastoid operations. *Ann. des mal. de l'or., du lar.*, vol. xxiv., 9.

207. To determine whether the pus comes from the attic or the antrum in cases of chronic otorrhœa, KREBS employs gauze packing after thorough cleansing. On the following day the gauze is removed, and it is carefully noted whether the new pus comes from the front or the back. Occasionally the pus comes from both places. Without a radical operation those cases are healed by simple curetting where the antrum is easily accessible from the auditory canal.

KILLIAN.

208. Some pen-and-ink sketches are given, showing partial forward dislocation of the articular process of the incus, total forward dislocation, partial and complete destruction of the articular process, and an adhesion which is not uncommonly seen passing from the head of the stapes in an upward direction, in cases of loss of the descending articular process; this adhesion being probably the cicatricial remains of the lining membrane which surrounds the joint.

The sketches are taken from patients who had been attending Professor PRITCHARD'S clinic during the year.

ARTHUR CHEATLE.

210. LOMBARD describes a case of cholesteatoma where he had employed the electric drill with great advantage.

ZIMMERMANN.

C.—CEREBRAL COMPLICATIONS OF CHRONIC PURULENT OTITIS.

211. ROPER, H. J., and LITTLEWOOD, H. A case of temporo-sphenoidal abscess. Trephining. Recovery. *Lancet*, Sept. 24, 1898.

212. BRONNER, ADOLPH. Notes on a case of purulent cerebral meningitis of aural origin with peculiar symptoms. *Lancet*, July 23, 1898.

213. JAKINS, P. Otitic cerebellar abscess. Recovery. *Medical Press and Circular*, Aug. 10, 1898.

214. PARSONS, FRANK S. A case of acute mastoiditis with lobar pneumonia followed by lateral sinus thrombosis and pyæmia. Recovery without operation. *Atlantic Med. Weekly*, Sept. 24, 1898.

215. CROUCH, J. FRANK. Report of a case of double mastoid abscess with openings into the cranial cavities. *Journal of Eye, Ear, and Throat Diseases*, July, 1898.

216. DENCH, E. B. Thrombosis of the lateral sinus dependent upon suppurative otitis media, with report of cases. *The Laryngoscope*, Aug., 1898.

217. COLLINS, B. C. A case of otitis media purulenta acuta (double) with mastoiditis on left side following removal of adenoids. *The Laryngoscope*, Aug., 1898.

218. RUMBOLD, FRANK M. Mastoiditis of dental origin in a diabetic, with an unusual formation of the mastoid cells. Operation. Recovery. *The Laryngoscope*, Aug., 1898.

219. DELSTANCHE, Jr. A case of intradural abscess following an acute otitis media purulenta. *Bull. de la soc. belge d'ot., de lar.*, 1898.

220. HENNEBERT and ROUSSEAUX. Otitic pyæmia after phlebitis of the sigmoid sinus and of the jugular vein. *Bull. de la soc. belge d'ot., de lar.*, 1898.

221. A girl, aged fourteen years, came to ROPER with a history of discharge from the left ear for 2 years. Typical symptoms of a temporo-sphenoidal abscess developed. Complete recovery after operation by LITTLEWOOD. ARTHUR CHEATLE.

222. At the post-mortem examination of a boy, aged sixteen years, who was under BRONNER'S care for cerebral trouble resulting from chronic middle-ear suppuration from the left ear, the following conditions were found: Convolutions on both sides, covered with thick gelatinous pus, which involved the base, as far back as the apex of the interpeduncular space, including the sheaths of the first to sixth nerves. A small subpial abscess the size of a marble communicated with the subdural collection of pus, and implicated the outer and inner aspects of the left frontal lobe, just anterior to the tip of the temporo-sphenoidal lobe. Points of interest were: that the pus was on both sides of the brain; during life the pulse was slow at the beginning, only once or twice reaching 80 per minute; no restlessness or irritability until a few days before death; no vomiting; and the presence of aphasia.

ARTHUR CHEATLE.

223. At a meeting of the British Laryngological Society held July 22, 1898, JAKINS records a case of recovery from cerebellar abscess. CHEATLE.

224. The case was that of a boy, seven and one half years of age, of a delicate constitution, and who was subject to frequent attacks of tonsillitis. He also had adenoids. When seen by the

writer, he had a suppurative inflammation of the left ear due to an attack of tonsillitis. A few days later the boy had a chill, followed by a temperature of 104° , pulse 130, respirations 40. Diagnosis was then made of lobar pneumonia, right side. The patient subsequently had another chill, and at this time had well marked symptoms of mastoid disease on the right side, with evidences of sinus thrombosis. This state of affairs was followed by pyæmic symptoms. The mother was opposed to an operation which was advised. The boy ultimately recovered.

GORHAM BACON.

215. The patient, a male, ten weeks previously had a severe inflammation of the throat and nose, followed by suppurative inflammation of both middle ears. Later there was mastoid disease affecting the right side. The mastoid cells were opened and found full of pus, and the sinus exposed. This was followed by a mastoid abscess on the left side; on opening the mastoid cells, a carious opening was found in the tympanic roof, leading to the middle cerebral fossa.

GORHAM BACON.

216. The writer draws the following conclusions :

1. A complete and prompt mastoid operation in every case. This means the removal of softened bone, no matter what structures may be exposed during the operation.

2. The early surgical intervention in all cases of sinus thrombosis, whether discovered during the mastoid operation, or recognized by constitutional symptoms.

3. That the advisability of interference with the internal jugular vein depends upon the presence of symptoms indicative of jugular thrombosis in every particular case.

GORHAM BACON.

217. The child was two years old, and the same night after the operation of excision of the adenoids, had earache. In the morning both ears were discharging, although previously the child had had no aural disease. In the left ear the mastoid became involved and an operation was necessary.

GORHAM BACON.

218. The case in question was that of a man sixty-seven years of age. Ever since eighth year of age, he had had a chronic otorrhœa of one side. He had also had diabetes mellitus for several years. He developed mastoid disease as a result of sea-bathing. He had been suffering with his teeth for a year. The few teeth he had were affected with Rigg's disease. Several teeth were extracted, and the mastoid was opened and found

sclerotic. The patient continued to have severe pain until several more teeth were extracted, when an abscess was found at the root of the molar tooth, and osteophytes on the root of the canine.

The writer reports the case to show the apparent connection between the dental and mastoid disease. Also that the diabetic condition had no apparent influence upon the cause of the trouble; and did not seem to affect in the least the repair of the surgical injury.

GORHAM BACON.

219. A boy of fourteen, with old-standing otorrhœa, suffered from mastoiditis. At the third operation, the exposed dura was incised, one half-liter of pus was evacuated, and the severe meningeal symptoms were relieved.

ZIMMERMANN.

220. The case of a man, twenty-two years old, where an operation was considered out of the question because of hemophilia; after one month the patient recovered. The first chill occurred 3 weeks after the otitis, and returned daily for 5 evenings; the jugular vein could be felt as a hard, painful cord.

ZIMMERMANN.

d.—OTHER AFFECTIONS OF THE MIDDLE EAR.

221. ESCHWEILER. A case of fibromyxoma of the mastoid process. *Arch. f. Ohrenhkk.*, vol. xlv., p. 18.

222. MCBRIDE, P., and TURNER, LOGAN. Hairy polypus in the left middle ear. *Edinburgh Hospital Reports*, 1898.

223. GRANT, DUNDAS. Chronic dry catarrh of the middle ear. *Med. Press*, July 27, 1898.

224. PRITCHARD, URBAN. Fracture of the handle of the malleus due to indirect violence. *King's College Hospital Reports*, 1897.

221. The growth occupied a cavity 2.5 by 5.5 *cm* in the mastoid process in a patient suffering from otorrhœa on that side since childhood. The tumor was exposed by removing the corticalis, which it had at one place perforated, where the epidermis had travelled in and partly lined the cavity.

BLOCH.

222. A child, aged seven years, had suffered with chronic suppuration from the left ear for one year. A fortnight before examination the mother noticed a long black hair protruding from the ear; on attempting to pull it out she broke it. While removing the left malleus under chloroform, it was found possible to cut away a small piece of skin which was attached to the wall

of the tympanic cavity ; springing from this piece of skin were two black twisted hairs, one of which measured 4 inches in length when uncoiled, the other $1\frac{3}{4}$ inches, probably the remnant of the hair which the mother had broken. The piece of skin to which the hairs were attached was so fragmentary that it was found impossible to preserve it for microscopic examination.

Fifteen months after the operation there was no evidence of hairs, although, as the ear had been neglected, the discharge still continued. The authors refer to two cases of recurrent hairy polypi growing from the middle ear recorded by Weydener and Scheibe in these ARCHIVES (vol. xxiv., p. 272) ; in these cases hair follicles were present.

These cases are interesting in showing that dermoids are occasionally met with in connection with the middle ear. Unfortunately McBRIE and TURNER do not state the precise position of the hair-bearing skin present in their case ; one would expect the neighborhood of Shrapnell's membrane to be the site in which dermoids would be likely to exist.

CHEATLE.

223. As some patients suffering with sclerosis say they have noticed improvement in hearing power and subjective noises after riding on a bicycle or in a vibrating vehicle, GRANT has been applying to the dorsal spine a vibrating instrument, made after the style of the mechanism employed in Gille de la Tourette's helmet, as a means of treatment. He promises to publish results.

CHEATLE.

224. A man, aged forty-four, was sent from the surgical wards to Professor PRITCHARD's clinic, on account of slight deafness in the left ear, resulting from a fracture of the base of the skull. On examination the membrane was found completely healed, but the handle of the malleus was seen to be separated from the short process by a distinct interval, being displaced backwards. By means of a Siegle's speculum, independent mobility could be plainly made out. The hearing power was not seriously interfered with, the patient only complaining of a stuffy feeling. The internal ear was intact.

CHEATLE.

NERVOUS APPARATUS.

225. PHROTIADES and GABRIELIDES. A case of deafness with disturbance of equilibrium and pulsating exophthalmos following a fracture at the base of the skull. *Ann. des mal. de l'or, du lar.*, xxiv., 8.

226. DRUAULT. Sarcoma of the internal auditory meatus. *Ann. des mal. de l'or., du lar.*, xxiv., 8.

227. HAMMERSCHLAG. A case of multiple cranial nerve affection. *Arch. f. Ohrenheilk.*, vol. xlv., p. 1.

228. MÜLLER, R. The diagnosis of traumatic affections of the internal ear. *Deutsche med. Wochenschr.*, No. 31, 1898.

229. LERNER, A. On tabic deafness. *Klin. therap. Wochenschr.*, Nos. 29 and 38, 1898.

230. PRITCHARD, URBAN. Unusual onset of congenital syphilitic internal-ear deafness. *King's College Hospital Reports*, 1897.

231. GRANT, DUNDAS. Alcoholic auditory neuritis. *Med. Press and Circular*, Aug. 10, 1898.

225. A man, twenty-six years old, after a fall on the left temple, suffered with hemorrhage from the left ear, epistaxis, vertigo, deafness, and left-sided pulsating exophthalmos. Examination three years later showed total deafness for loud voice, vertigo on closing the eyes, slight ataxia, very intense tinnitus, which disappeared on galvanization, and was considered to be due to a hyperæsthesia of the auditory nerve.

ZIMMERMANN.

226. A girl of seventeen has suffered with right facial paralysis, deafness, and headache for six years; vomiting, incomplete right hemiplegia with anæsthesia of the same side, and double optic neuritis appeared; no aphasia, but a certain hesitancy in speech was present. Antisyphilitic treatment was of no avail. A tumor in the left hemisphere was suspected and the skull was trephined and the lateral ventricle punctured. No result. Death six weeks later. At autopsy a cystic tumor 5 cm in diameter was found under the tentorium, resting upon the cerebellum, originating from the opening of the internal auditory meatus and attached to the meninges and the two nerves. It showed the structure of a spindle-celled sarcoma. The slow development (6½ years) is noticeable.

ZIMMERMANN.

227. The patient was suddenly taken ill with fever, facial paralysis, disturbances in the first and second branch of the fifth nerve, deafness, and auricular herpes zoster. Nystagmus, vertigo, nausea, and vomiting were present. It was supposed to be a disease of the various nerve trunks.

BLOCH.

228. MÜLLER examined thirty cases of injury and found in

about half the cases a chronic hyperæmic condition in the depth of the ear-canal and the drum-membrane. This condition is to be separated from inflammatory conditions, and is characteristic for the results of trauma involving the head and may lead to deafness, subjective noises, vertigo, and headache.

NOLTENIUS.

229. The tabic disease of the auditory nerve begins with tinnitus, vertigo, nausea, pain in the ear, and hyperacusis; of these tinnitus is most constant. Later hearing is affected and may be lost entirely. Ménière's symptom and pains may be present even when deafness exists. By the use of the weak galvanic current tinnitus was somewhat relieved. No improvement in hearing.

POLLAK.

230. A boy, aged eleven years, was brought to Professor PRITCHARD's clinic on account of gradual deafness, with attacks of giddiness and staggering gait. The symptoms were those of chronic Ménière's disease. Keratitis supervened ten months after the onset of the aural symptoms.

CHEATLE.

231. An alcoholic, suffering with internal-ear deafness with pronounced anæsthesia of the feet and front of legs, received great improvement from the administration of strychnia and abstention from alcohol.

CHEATLE.

NOSE AND NASO-PHARYNX.

a.—ANATOMY.

232. NEUMAYER, L. On the histology of the nasal mucous membrane. *Sitzungsbericht der Gesellschaft f. Morphologie, etc.*, München, vol. xiv., No. 152.

232. The respiratory epithelium contains numerous goblet cells. The glands of the lower two conchæ are of the mixed variety, mucous glands with crescents. Bowman's glands in the olfactory region secrete a mucous and serous fluid. KRAUSE.

b.—GENERAL SYMPTOMATOLOGY AND PATHOLOGY.

233. MALATO. The pathogenic micro-organisms of the physiological nasal cavity and the attenuating power of the nasal mucous membrane. *Arch. ital. di Otolog.*, etc., p. 345, 1897.

234. LEVY, ROBERT. Serious consequences following intranasal operations. *Laryngoscope*, Sept., 1893.

233. According to MALATO, pathogenic bacteria are almost

constant in the anterior part of the nose. They rapidly become attenuated and disappear. The nasal mucous membrane has no distinctive action upon them; the epithelium prevents the development of the spores. If in disease of the mucous membrane the same pathogenic micro-organisms are found, it is because the epithelium is no longer in a physiological condition.

GRADENIGO.

234. CASE 1. Male, æt. thirty, suffered from rheumatism and morphinism, which had been discontinued, and cardiac attacks due to excessive use of tobacco. Nasal obstruction and epistaxis from cartilaginous spur and septal deviation to the left side, with erosion, led to removal of the spur. An Asch operation was then easily performed under cocaine. Extreme carelessness of patient after operation by constant picking of nose, removal of tube, and failure to report for a week led to perforation of septum. Septicæmia, with depression, headache, pain in knee-joints, 103° F., 120 pulse, set in, followed by mitral regurgitation, slight paralysis of right leg, deliria, increase of all deep reflexes, with final and complete motor and sensory paralysis of right side. Death ensued in three days. Autopsy: Left optic thalamus and posterior part of internal capsule softened and broken down. Arteritis and plugging at first bifurcation of posterior cerebral artery. Old adhesion of left pleura, endocarditis, universal pericarditis, with adhesions. Spleen and liver large and soft with many infarcts. Hemorrhagic infarcts about smaller arteries of knee-joints.

CASE 2. Female, æt. twenty-five, with family history of phthisis pulmonum, had suppuration of both ears; influenza in 1893 and 1894. In April, 1894, cottonwood fever (like hay fever) until June. She had hypertrophic rhinitis with large exostoses adherent to outer wall. Right exostosis removed without accident. Ten days after removal of left exostosis patient died from cerebral meningitis. No autopsy.

In conclusion, LEVY carefully reviews the literature upon accidents following intranasal surgery and appends a complete bibliography.

M. TOEPLITZ.

C.—METHODS OF EXAMINATION AND TREATMENT.

235. GRADENIGO. On nasal surgery, especially in its relation to disease of the ear. *Arch. ital. di Otol.*, etc., 1897, p. 408.

236. FINK. When is the use of the galvano-cautery indicated in the nose? *Wien. med. Presse*, Nos. 33 and 34, 1898.

237. HECHT, H. The treatment of turbinate hypertrophy. *Arch. f. Laryngol.*, vii.

238. HAMM. The submucous treatment of hypertrophic rhinitis. *Monatschr. f. Ohrenheilk.*, No. 8, 1898.

235. GRADENIGO prefers the bloody operations in the nose as against the bloodless methods of galvano-caustic and electrolysis. The objections to the latter are as follows: the difficulty of exactly limiting the operation, insufficient action, causation of a wound with necrotic tissue, ready infection of the wound. It is irrational to destroy tissue which may be removed easily. The total removal of the middle or lower turbinates is rarely indicated; careful asepsis is necessary.

GRADENIGO.

236. FINK is in general opposed to the use of the galvano-cautery in the nose except in cases of marked primary hypertrophy of the turbinate. He is in the habit of drawing deep furrows in the tissue and removes the intervening membrane with a snare.

POLLAK.

237. HECHT advocates the use of trichloroacetic acid in substance. He applies this remedy to posterior hypertrophies with two protected carriers, one applied through the nose and the other through the naso-pharynx.

ZARNIKO.

238. HAMM has had good results with the submucous injection of $\frac{1}{2}$ gr. of a 10 per cent. zinc chloride solution in chronic swelling of the lower concha.

KILLIAN.

d.—OZÆNA.

239. DE SIMONI. The bacteria of ozæna. *Arch. ital. di Otol.*, etc., vol. i., p. 305, 1897.

240. FRANKENBERGER, O. The serum therapy in ozæna. *Klin. therap. Wochenschr.*, Nos. 39 and 40, 1898.

239. DE SIMONI examined bacteriologically 12 cases of ozæna and found the bacillus mucosus, the pseudo-diphtheria bacillus, Fränkel's diplococcus, and the staphylococcus pyogenes present. Fränkel's diplococcus proved to be very virulent. Attempts at inoculation of normal noses with pure cultures were negative. Hence it is probable that besides the bacteria a predisposition must be present.

GRADENIGO.

240. FRANKENBERGER inoculated 3 cases of ozæna with serum. He believes that the trouble was ameliorated, but that a cure is

impossible. He obtained the same effect with injecting salt solution, and concludes that ozæna is a tropho-neurosis and not a parasitic disease.

POLLAK.

e.—SEPTUM.

241. ESCAT. A simple method of resecting the deflected nasal cartilage without perforation. *Arch. intern. d'otol., de lar.*, xi., 4.

242. DOUGLASS, BEAMAN. The restoration of a deflected nasal septum. *N. Y. Med. Jour.*, Aug. 6, 1898.

241. Both sides of the septum are cocaineized. A submucous injection of about 3 *ccm* of distilled water is made on the concave side of the deflection; the convex prominence is cut away with a quick stroke of the knife. Packing. A perforation is thus avoided; the raw surface granulates rapidly and forms a firm membranous septum. The difficulty consists in injecting between mucous membrane and cartilage, and to prevent the injected fluid from running off. In ESCAT's 5 cases 4 were successes; in the fifth case, owing to previous operations, the mucous membrane could not be detached and a perforation resulted. ZIMMERMANN.

242. DOUGLASS divides the cases of deflected septum into: 1. Deflected cartilaginous septum with (*a*) bowing, (*b*) ridged, (*c*) sigmoid deformity; or (*d*) complicated with turbinal enlargement of the free side, exostoses, ecchondroses, or dislocation from the superior maxillary ridge. 2. Deflected cartilage and osseous septum. 3. Deflected cartilage with external deformity. 4. Deflected cartilage with high osseous palate. 5. Deflected cartilage with perforations from traumatism, ulceration, or abscess.

Douglass removes exostoses, ecchondroses, or pathological conditions of the turbinated tissues prior to the operation for deflected septum. In the latter, the septum is perforated at the most posterior part of the deflection with the spear knife, and into this incision, $\frac{3}{4}$ inch long, a blunt-pointed bistoury is introduced and drawn forward, cutting all the ridges lengthwise. In case of dislocation of the cartilage from the superior maxillary ridge, the same incision is made along the dislocation. Ordinary displacements of both the bony ridge and cartilage are straightened with Adams's forceps. Adhesions are then broken up, the fragments pushed to the unobstructed side with the finger, and non-perforated splints of vulcanized rubber, flat on septal and concave on turbinal side, with straight lower border, are introduced.

M. TOEPLITZ.

f.—TUMORS OF THE NOSE.

243. EICHLER. Adenoma resembling a septal polyp. *Arch. f. Laryngol.*, vii.

244. OKADA, W. The pathology of the so-called mucous polyps of the nose, with remarks on the staining of mucus. *Arch. f. Laryngol.*, vii.

245. MACKENZIE, G. HUNTER. A case of malignant polypus of the nose, with remarks. *British Med. Jour.*, July 9, 1898.

246. LOEB, HANAU W. Rhino-pharyngeal fibroma. *Annals of Otol. and Rhinol.*, etc., May, 1898.

247. THORNER, MAX. Adeno-carcinoma of the nose. *Med. Record*, Sept. 24, 1898.

243. A tumor of the size of a bean situated near the tuberculum septi was removed with the cold snare. Microscopically the tumor was entirely composed of glandular convolutions.

ZARNIKO.

244. OKADA regards mucous polyps as inflammatory new growths. The superficial epithelium is in partial or complete mucoid metamorphosis. The glandular elements are usually increased in number, and generally mucous in type, rarely serous; the acini are dilated. The stroma consists of alveolar, more or less loose connective tissue containing round cells and serum albumin, but never mucus.

ZARNIKO.

245. A lady aged about sixty years was first seen by MACKENZIE on Sept. 23, 1897; three months previously profuse hemorrhage had occurred from the left nostril, and three or four recurrences of the bleeding had taken place since then. On examination both nostrils were occupied by polypi. On the right side they appeared of a simple character. On the left they were numerous, and completely filled the cavity; their color was mostly dark brown, but at places slaty gray resembling simple polypi; free bleeding occurred on gentle probing. The individual polyp could be differentiated, but distinct pedicles could not be made out. No pain was present, and there was no glandular enlargement.

On attempting removal with cold or hot snare, there was considerable bleeding. December, 1897, the growths appeared as a dense, black, sloughy mass, bleeding freely and frequently, and which gradually extended into the right nostril, left antrum, and mouth, causing marked bulging of the cheek and closing the eye. There was a continuous fetid, sanguineo-purulent discharge, and

slight variable pyrexia during the last two months of life, death taking place on February 12, 1898.

Microscopical examinations in the later stages showed it to be a round-celled sarcoma of great vascularity. In the earlier stages microscopical examination indicated simple mucous polypi, on two occasions. Mackenzie is inclined to think that the hemorrhage is the most reliable test of malignancy in these cases; and that sessile polypoid septal growths, or blood-stained or hemorrhagic spots or areas on the surfaces of what appear to be ordinary simple polypi, along with frequent and profuse bleedings, are almost conclusive proof of malignancy.

ARTHUR CHEATLE.

246. LOEB reports a case of naso-pharyngeal tumor of a girl aged thirteen, which rapidly developed from the fornix pharyngis, extending with two projections into both nostrils, which were completely filled. Microscopic examination ascertained a cyst-adenoma fibromatosum vasculosum. The growth, removed by galvano-cautery snare, did not recur.

M. TOEPLITZ.

247. THORNER reports the case of a farmer, aged forty-seven, with obstruction in the left nasal cavity, due to a growth extending from the vestibule to the Eustachian tube. Microscopical examination showed it to be a typical adenoma. After repeated thorough removals, recurrence took place; but a radical operation was declined. Later examinations revealed a change of the adenoma into epithelioma. The tumor finally extended to the right side, the left orbit was infiltrated, swallowing became difficult, hearing in left ear destroyed. No autopsy. The development of the tumor consumed two years. A bibliography is appended to the paper.

M. TOEPLITZ.

g.—ACCESSORY SINUSES.

248. BOULAY. Empyema of a maxillary antrum with diverticula and partitions. *Arch. intern. de laryng., d'otol.*, xi., 4.

249. POSTHUMUS, M. A case of pneumatocele of the frontal sinus. *Bull. de la soc. belge d'ot., de lar.*, 1898.

248. In a case with all symptoms of antral empyema, puncture through the second premolar showed no pus. On aspiration a very minute quantity appeared to come from a fistulous tract at the inner end of the canal and passed back and out, below a vertical partition into a cavity corresponding to the zygomatic ridge. The opening was enlarged and irrigations were kept up for eight

months, when the fluid returned clear. This was probably a primarily accessory division of the maxillary cavity.

The other case was a man of almost forty who complained of a prominence of the hard palate and pus discharging into the nasopharynx. Puncture from the lower meatus was unsuccessful. A collection of pus was shut off from the antrum by an oblique partition wall.

ZIMMERMANN.

249. A man, eighteen years of age, had had an ethmoid empyema, and now complained of a swelling over the right eye and headache which reacted favorably to iodide of potash. Transillumination negative. The frontal sinus was opened, the bone was very thin and the cavity very large, lined with normal mucous membrane. The author believes this to be a case of pneumatocele, the result of a temporary closure of the duct.

ZIMMERMANN.

h.—OTHER NASAL AFFECTIONS.

250. LERMOYEZ. Acute rhinitis. *Traité des maladies de l'enfance*, vol. iii.

251. DREYFUSS. Hemorrhage from the upper air passages in hepatic cirrhosis. *Munch. med. Woch.*, No. 32, 1898.

252. SPIES, G. The etiology of certain reflex neuroses. *Arch. f. Laryng.*, vii.

253. LICHTWITZ. Acute osteomyelitis of the superior maxilla simulating an empyema of the antrum. *Arch. f. Laryng.*, vii.

254. BAUMGARTEN. Bony occlusion of the choanæ. *Monatschr. f. Ohrenheilk.*, No. 9, 1898.

255. CASSELBERRY, W. E. A case of nasal fibroma. *Annals of Otology*, May, 1898.

256. POOLE, WM. H. Rhinolith. *N. Y. Med. Journ.*, July 9, 1898.

257. REARDON, TIMOTHY J. Fracture of the nose complicated by a rhinolith. *Boston Med. and Surg. Journ.*, July 28, 1898.

250. LERMOYEZ, divides rhinitis as follows :

1. Acute rhinitis : *a*, of the child ; *b*, of the infant.
2. Acute suppurative rhinitis : *a*, of the child ; *b*, of the infant.
3. Pseudo-membranous rhinitis (spasmodique).
4. Vasomotor rhinitis.

The acute rhinitis, though harmless in children, may be dangerous to the infant on account of asphyxia and inanition. The

treatment consists in the air-douche and menthol, calomel internally. Acute suppurative rhinitis occurs in children between seven and twelve, often accompanied by impetigo, and is caused by the staphylococci. New-born are infected during birth, usually gonorrhoeic in nature, begins on first or second day with bloody discharge. Pseudo-membranous rhinitis appears as a form of diphtheria, or milder without hemorrhages as rhinitis fibrinosa. The vasomotor rhinitis appears in the spring and autumn as hay fever, or irregularly with eye symptoms or bronchial with asthmatic attacks.

252. Sneezing, vasomotor coryza, hay fever, nasal asthma, are always produced by the contact of two opposite mucous membranes. If the contact is interrupted these neuroses should disappear. A favorite spot is the tuberculum septi, rarely the lower concha. The views of the author on this subject are perhaps a little too sanguine.

ZARNIKO.

253. A patient, twenty-nine years of age, had an osteomyelitis in the left canine fossa after an injury which led to the sequestration of the entire alveolar process. Pus emptied into the lower meatus through a fistula, but puncture showed that the maxillary antrum was not affected.

ZARNIKO.

254. Congenital, one-sided total bony closure of a choana. Operation with drill and chisel. BAUMGARTEN has also observed a case of partial bony closure of both upper halves of the choanæ.

KILLIAN.

255. CASSELBERRY observed eleven years ago in a woman, æt. thirty-nine, a tumor in the left nasal fossa, which filled it anteriorly and projected from it. The antrum Highmori, orbit, and naso-pharynx were not encroached upon. Its primary attachment extended along the horizontal plate of the ethmoid bone, including the adjacent cells. The tumor, removed with galvano-cautery, did not recur. Examination proved it to be a genuine pure fibroma.

M. TOEPLITZ.

256. POOLE's patient, a female, æt. twenty-four, who had been suffering for many years from nasal catarrh, and particularly during the last two or three years from profuse, offensive discharge, obstruction, and loss of smell, was operated for a large hypertrophy of the left lower turbinate. A hemorrhage ensued which had to be controlled by posterior plugging. After the removal of the tampon on the following day a body was found attached to the posterior end of the lower meatus, upon its outer

side, lying in a groove, $2\frac{1}{2}$ inches long, with a loose and sharp anterior end, freely movable around its long axis, which was removed with dressing forceps, and together with two smaller pieces taken out on next day was composed of amorphous phosphates of sodium and calcium.

M. TOEPLITZ.

257. A bicycle rider, twenty-eight years old, struck his nose against the temple of the pole-rider of a tandem coming from the opposite direction. Epistaxis continued for four hours and a half; the root of the nose was swollen; fine crepitus due to air, and on deep pressure distinct bone crepitus without depression, of the parts, were felt. The septum deviated to the left and occluded the left nostril. The wide right nostril contained a grayish mass close to the lower turbinate, which, easily removed, was found, on section, white, 1 cm in diameter, with a cherry stone as nucleus. The septum was not broken by the traumatism and the nasal bones not markedly depressed.

M. TOEPLITZ.

i.—PHARYNGEAL TONSIL.

258. KILLIAN (Worms). Embryological, anatomical, and clinical investigations on the tonsillar cleft and the soft palate. *Arch. f. Laryng.*, vii., pp. 167-203.

259. PELTESOHN. The etiology and prophylaxis of rheumatism. *Deutsche Medizinische Zeitung*, 1898, Nos. 61-66.

260. SENDZIAK. On the results of operations for adenoids. *Arch. f. Laryng.*, vii.

261. LAUFFS. The disappearance of prolapsus ani after removal of adenoids. *Arch. f. Laryng.*, vii.

262. HINKEL, F. W. Death following immediately an operation for naso-pharyngeal adenoids under chloroform. *Laryngoscope*, Aug., 1898.

258. In many individuals a probe can be passed for $1\frac{1}{2}$ cm or more at the upper end of the tonsil into the soft palate. These spaces are very carefully described in this paper, and the results of careful clinical examinations of 100 tonsils and the surrounding structures are added.

ZARNIKO.

259. According to PELTESOHN, rheumatism represents a feeble type of pyæmia from the well-known connection between acute articular rheumatism and certain changes in the nose and pharynx. As a prophylaxis against rheumatism he recommends removal of all pathological conditions in the nose, mouth, and pharynx,

especially adenoid tissue. Finally, he emphasizes the importance of guarding against over-exertion, and advises regulation of the intestinal and renal functions. BRÜHL.

260. SENDZIAK mentions the results of the operation for adenoids in improving the general condition, the intelligence, the hearing, deaf-mutism, reflex neurosis (enuresis, etc.), defects in speech, etc. ZARNIKO.

261. A boy of five had suffered from prolapsus ani for three years. Permanent disappearance after removal of adenoids.

ZARNIKO.

262. A boy, aged eight years, was operated for adenoids under chloroform, which was taken badly, and was, soon after one ounce had been given, discontinued. The operation was then continued for a few moments, but the boy died just at its conclusion. The death was due to the habitus lymphaticus. Chloroform should be discarded and substituted by nitrous oxide and ethyl bromide. Eighteen deaths can be attributed in less than five years to the administration of chloroform in operations whose mortality is insignificant. M. TOEPLITZ.

SOFT PALATE, PHARYNX, AND BUCCAL CAVITY.

263. RAOULT and FINCK. Congenital malformation of the palatal vault. *Arch. intern. de laryng., d'ot., xi., 4.*

264. LAURENS. A chronic abscess of the palatal vault. *Ann. des. mal. de l'or., du lar., xxiv., 9.*

265. WALSHAM, HUGH. Latent tuberculosis of the tonsil. *Lancet*, June 18, 1898.

266. WALSHAM, HUGH. On the occurrence of cartilaginous and bony nodules in the tonsil. *Lancet*, Aug., 1898.

267. JONAS, A. T. Removal of the epitheliomatous tonsil by pharyngotomy. *Four. Amer. Med. Assoc.*, Aug. 13, 1898.

263. A man, twenty-one years old, with no previous history of syphilis, presented an oval opening at the base of the uvula, involving the soft palate and passing off on each side as a narrow slit, to the outer branch of the palatal arch. ZIMMERMANN.

264. In this patient two small fistulous passages emptied into the groove above the right tonsil, one proceeding to the soft palate, the other between the palatal arch and the tonsil.

ZIMMERMANN.

265. As a result of 34 post-mortem examinations of the tonsils, in cases dying of tuberculosis, 20 were found to be "more or less"

tuberculous ; with the exception of two cases only, nothing was present during life to call attention to the tonsils.

WALSHAM has also made microscopic examinations of tonsils and adenoids removed during life, but with entirely negative results, as regards tubercle.

He draws the following conclusions :

1. That the tonsils, instead of being almost immune from tuberculous disease, are very frequently affected.
2. That tubercle may be primary in the tonsil.
3. That the tonsils are very frequently affected, secondarily, in persons suffering from chronic pulmonary tuberculosis.
4. That when the tonsils are tuberculous the cervical glands, receiving the lymphatics from these organs, are also frequently affected with tubercle.
5. That the follicular glands at the base of the tongue are rarely found tuberculous.
6. That the tonsils may be affected from without or through the blood stream in acute miliary tuberculosis.

CHEATLE.

266. Among 34 consecutive post-mortem examinations of the tonsils, WALSHAM found cartilaginous and bony nodules in two instances. He thinks the condition to be of fœtal origin, that is to say, cartilaginous nests derived from the second branchial arch ; but Kanthack, to whom the sections were shown, regards it as merely a metaplasia from fibrous tissue into bone or cartilage.

CHEATLE.

267. CASE 1. Mechanic, æt. forty, suffered from bleeding, ulcerated, hard enlarged right tonsil with involvement of pillars. It was removed from without after formation of a triangular flap, then retraction of carotid, internal jugular, pneumogastric, and digastric, mylohyoid, and hyoglossus muscles. There was no recurrence for four years.

CASE 2. Farmer, æt. fifty-six ; the growth occupied left tonsil, projecting toward uvula, extending upward along the anterior and posterior pillars, and downward to margin of epiglottis, and externally adherent to soft sublingual gland, below which three hazel-nut-sized nodules were felt. After flap formation, the external jugular was ligated, the sterno-cleido-mastoid muscle diagonally divided, glands underneath, intimately connected with internal jugular, and both internal and external carotids, which were ligated, removed, pneumogastric isolated, and tonsillar mass excised. The buccal and pharyngeal mucous membrane could be

but partially united ; the remaining fistula closed after six weeks. After operation there were at first laryngeal spasms. On third day, the vision in the left eye was abolished, owing to embolus in central retinal artery, and the tongue became atrophied on the left side. After some improvement, the patient died from pneumonia three months later.

M. TOEPLITZ.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF NOVEMBER 22, 1898.

BY DR. H. A. ALDERTON, SECRETARY.

President, Dr. GORHAM BACON, in the chair.

Dr. FRED. WHITING acting as Secretary *pro tem*.

Dr. E. B. DENCH presented a device of Haug's for instructing students in the appearances of the fundus of the ear. Also Jansen's forceps for cutting away the bony boundaries of the aditus ad antrum.

Dr. J. B. EMERSON reported the case of a naval officer, attached to the *Oregon*, who was injured by the concussion produced by gun-firing. Perfect healing was brought about.

Dr. DENCH had treated a similar case from the *Iowa*, also with perfect healing.

Dr. C. J. KIPP had treated a case, an officer on the *Indiana*, with rupture of both tympanic membranes, with the same result.

Dr. DENCH gave the history of a case of chronic suppurative otitis media, complicated by mastoiditis, on which he had operated. Cholesteatomatous material was found in the antrum and in the attic. He started to do a Stacke operation, but found a fistulous tract leading to the sinus, and from this tract pus flowed freely; then uncovered the sinus, which was incised, and a small clot completely obstructing the sinus was found. The clot was removed and the circulation re-established in both directions. Uninterrupted recovery. The first dressing was permitted to remain for eight days. This case was cited as an argument for thorough operation when a serious condition is encountered unexpectedly.

Dr. E. GRUENING advocated the thorough removal of the mastoid process and advised removal of the tip whenever empyema of the antrum is found. Also reported a case in which he

opened a healthy mastoid because of an hysterical tenderness of the tip.

Dr. F. M. WILSON related the history of a case of a woman who refused operation for mastoiditis following chronic suppuration of the middle ear. She left the hospital, but returned six weeks later and was operated upon. Two cortical perforations were found, one in the canal and one in the suprameatal triangle.

DRS. DENCH and TOEPLITZ had seen similar cases. Dr. Toeplitz's case had been complicated by facial paralysis.

Dr. DENCH had seen two cases which had originated meningitis by perforating the squama.

Dr. GRUENING related the history of a case of swelling of the membranous canal, some discharge, and marked mastoid tenderness. The swollen canal was incised, and a probe passed into the antrum through the incision in the canal wall. Later mastoiditis, with extensive destruction of the cellular structure of the process, was found.

Dr. A. H. BUCK deprecated the necessity of a secondary operation in mastoiditis. He advocated uncovering a small area of the sinus and of the dura over the tegmen tympani in all cases, especially in private practice. This procedure does no harm, and may save one from the necessity of doing a secondary operation.

Dr. GRUENING took exception to this advice, unless it be limited to those cases in which softened bone is found. Thought the procedure too radical.

Dr. J. L. ADAMS stated that he had made it a practice to remove the sigmoid groove in all cases.

Dr. TOEPLITZ thought that the sinus was infected sometimes when the sigmoid groove was healthy.

Dr. BUCK claimed that the inner table may seem healthy, but be perforated by small veins which infect the under side of the bone or contiguous dura, and this could be recognized if the groove be opened.

Dr. GRUENING thought that the apex cell was the key to the situation.

Dr. BACON agreed with Dr. Buck that the wall of the sigmoid groove may appear healthy and still the sinus be infected.

Dr. DENCH thought that a man exceeded his duty if he cut away healthy tissue. He had, however, seen a secondary operation as a result of leaving the walls of the aditus, which were carious, but not so recognized.

Dr. BUCK adhered to his original proposition.

Dr. W. P. MARPLE asked for an expression of opinion regarding the necessity for repeated incisions of the tympanic membrane.

Dr. DENCH believed that free incision will rarely fail, if made early, to abort further trouble, and does not usually require repetition ; mastoiditis seldom follows.

Dr. GRUENING had found it necessary to repeat the operation.

Dr. DENCH often combined incision of the tympanic membrane with an internal Wilde's. Does it under nitrous oxide anæsthesia.

Dr. TOEPLITZ had seen the galvano-cautery used to make a permanent opening.

Dr. WILSON asked for an opinion as to the treatment in cases of profuse suppuration subsequent to scarlet fever.

Advised to keep them in the hospital and feed them up.

MISCELLANEOUS NOTES.

ANNOUNCEMENTS.

SIXTH INTERNATIONAL CONGRESS OF OTOLOGY, 1899,
LONDON.

PROGRAMME.

Monday, August 7th, 9 P.M.—Reception.
Tuesday, “ 8th, 10 A.M.—Opening Meeting; President's
Address; Election of Officers.
3 to 6 P.M.—Papers.
Wednesday, August 9th, 10 to 1.30 P.M.—Papers.
Evening.—President's Dinner.
Thursday, “ 10th, 10 to 1.30.—Papers.
Friday, “ 11th, 10 to 1.30.—Papers.
3 P.M.—Closing Meeting.
Evening.—Dinner given by the British
Otologists.
Saturday, “ 12th.—Excursion.

The reception and meetings will be held at the Examination Hall of the Royal College of Surgeons and Physicians, Thames Embankment.

LIST OF SUB-COMMITTEES APPOINTED.

Reception: GEORGE P. FIELD, Vice-Chairman; EDWARD LAW, H. MACNAUGHTON JONES, ST. CLAIR THOMSON, RICHARD LAKE, Hon. Sec.

Excursion: DUNDAS GRANT, Vice-Chairman; WILLIAM HILL, W. R. H. STEWART, C. WAGGETT, P. MACLEOD YEARSLEY, Hon. Sec.

Dinner: T. MARK HOVELL, Vice-Chairman; J. W. BOND, J. B. BALL, L. A. LAWRENCE, Hon. Sec.

Museum: C. A. BALLANCE, Vice-Chairman; THOS. BARR, P. MCBRIDE, W. MILLIGAN, F. W. BENNETT, H. TILLEY, A. BROWN KELLY, C. E. FITZGERALD, A. LOGAN TURNER, H. R. WOODS, ADOLPH BRONNER, H. SECKER WALKER, JOBSON HORNE, ARTHUR H. CHEATLE, F. MARSH, A. SANDFORD, J. W. BARRATT, W. RIDLEY, STEPHEN PAGET.

The President-elect, Professor URBAN PRITCHARD, is Chairman of each Sub-Committee. The Treasurer, Mr. A. E. CUMBER-

BATCH, and the Secretary-General, Mr. CRESSWELL BABER, are also members of each Sub-Committee.

In order to make the Museum as complete and representative as possible, it is hoped that otologists from all parts of the globe will send specimens of the ear, nose, or naso-pharynx for exhibition.

All specimens should be sent to the Examination Hall, Thames Embankment, addressed to the Hon. Secretary of the Museum Sub-Committee, between the 16th and 26th of July, 1899; or they may be deposited by members themselves not later than Saturday, August 5th. It is earnestly requested that a thorough description of each specimen will be sent to the Hon. Secretary, ARTHUR H. CHEATLE, 117 Harley Street, London, before JUNE 30TH, to facilitate the arranging of the Museum and to insure insertion in the catalogue. It is desired to make the catalogue a permanent work of reference.

THE BRIGHTON, HOVE, AND SUSSEX THROAT AND EAR HOSPITAL.

On November 29, 1898, His Grace the Duke of Norfolk opened the first portion of the new building. The Hospital will now accommodate twenty in-patients, and is admirably designed and fitted throughout.

In three years' time more ground will come into the possession of the Hospital, and will be utilized for building a large waiting-room for out-patients, board room, etc.

The Hospital was founded as a Dispensary in 1878. In 1889 six beds were opened for in-patients, but owing to the increase in the work it was found imperative to obtain a new building.

We congratulate those who have so well carried out the scheme, and wish the Hospital every success in its new garb.

THE TEACHING OF OTOTOLOGY IN THE PROPOSED NEW UNIVERSITY AT BIRMINGHAM.

Mr. H. BENDELACK HEWETSON, of Leeds, in a letter to the *British Medical Journal*, November 26, 1898, draws attention to the fact that no provision has been made for the teaching of otology in the projected medical department of the new Birmingham University.

We are sure that this omission has only to be brought to the notice of those responsible for the election of professors and lecturers, and they will recognize the importance of the new uni-

versity being properly equipped in every branch, in order that the work undertaken may be thoroughly done.

APPOINTMENTS.

AGAR, MORLEY F., M.R.C.S., L.R.C.P., Assistant Surgeon, to be Surgeon to the Nose, Throat, and Ear Department of the Hospital of St. Francis, New Kent Road, London.

KELYNACK, T. N., M.D., M.R.C.P., Honorary Pathologist and Bacteriologist to the Manchester Ear Hospital.

MILLER, G. VICTOR, M.B., C.M. (Edin.), Eye, Ear, and Throat Specialist, North Riding Infirmary.

HAWKINS, G. T., M.R.C.S., Honorary Surgeon for Diseases of the Ear, Throat, and Nose to the Prince Alfred Hospital, Sydney, Australia.

Dr. FRANCIS J. QUINLAN, of this city, has been appointed Laryngologist and Rhinologist to Charity (City) Hospital, Blackwell's Island, by order of the Commissioners of Charity and Correction.

BRITISH LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL ASSOCIATION.

The following gentlemen have been elected officers for the ensuing year, 1898-9 :

President, Dr. MIDDLEMAS HUNT, Liverpool ; *Vice-Presidents*, Dr. DAVISON, Bournemouth, Mr. JOHN BARK, Liverpool, Mr. WYATT WINGRAVE, London ; *Treasurer*, Dr. MCNIEL WHISTLER ; *Honorary Secretaries*, Mr. ST. GEORGE REID, Dr. FURNISS POTTER.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

JACKSONIAN PRIZE.

The College of Surgeons gives an annual prize of £12 for the best essay on a selected subject. Fellows or members of the College are eligible for competition. The subject chosen for 1899 is : "The Pathology, Diagnosis, and Treatment of Inflammatory Affections of the Nasal Fossæ and the Associated Sinuses and Air Cells."

Essays must be sent in not later than 4 o'clock on the 30th of December, 1899. A *nom de plume* or motto must be adopted, but a sealed envelope containing the name and address of the sender must also be enclosed.

The manuscript prize dissertation and every accompanying drawing and preparation become the property of the College.

ARCHIVES OF OTOTOLOGY.

A CONTRIBUTION TO THE SURGERY OF THE
TEMPORAL BONE.

BY DR. ROBERT SATTTLER, CINCINNATI, OHIO.

(Continued from p. 12, Vol. XXVIII.)

Sclerosis and Rarefaction of the Temporal Bone are frequent and interesting pathological expressions enacted as results of *known* chronic focal and general lesions of the tympanic cavity and its pneumatic accessories. The varied textural alterations we meet, with the specific morbid changes which cause them and terminate either in increase of solidity or abnormal thinning of different localities, or of the entire temporal bone, can be surmised in part only, before surgical intervention is resorted to. Important knowledge concerning these so often treacherous secondary lesions must therefore remain unknown until this has been undertaken. The demand for such interference is as often one of expediency as of imperative necessity. It is not always to meet sudden and therefore unlooked-for complications, but rather to be ready for those which surgical experience, and pathological studies as well, have taught us we must look upon as being in constant evidence and therefore liable to occur at any time.

The brief recital of surgical experience with this group of cases indicates, imperfectly only, the wide scope of its application. It refers, merely, to the more uncommon clinical expressions of these insidious consequences of chronic middle-ear lesions.

Among these are :—**Excessive and persistent** neuralgia as an attendant of hyperostosis or solidification of the mastoid region ;—**Necrosing otitis**, suddenly and mysteriously

starting in the sclerosed or rarefied areas of the bone ; —Gradual absorption, but not necessarily erosion, of the tympanic attic and antrum, as a result of low inflammatory activity, accompanied by the slow but **uninterrupted choking up with cholesteatomatous masses of these already abnormally dilated cavities.**

In a certain number of latent chronic pyogenic lesions of the tympanic cavity common surgical experience refers to and upholds a probable causal relationship between hyperostosis of the mastoid region with partial or complete obliteration of the air-cells and intense and prolonged neuralgic suffering.

A smaller contingent of cases has been referred to before, which also belong unmistakably to this category, in which, however, every tangible evidence of a middle-ear lesion was absent at the time of or antedating these violent outbursts of suffering, vide p. 480, volume xxvii.

The point of interest is not the occurrence of hyperostosis, for that is admitted and established as a not infrequent final expression of certain purulent lesions of the tympanic cavity, of low grade, of interminable duration, characterized furthermore by wholly latent clinical evidences. Whether we can, however, assume a causal relationship between the sudden and violent outbursts of neuralgic suffering and the bone solidification which is in progress, remains, even with these cases, an open question. The paroxysms of suffering come about without assignable cause and without warning and resist every other method of treatment except surgery. They are unattended by fever or other constitutional disturbance except that which results from prolonged, unrelieved suffering. There is absence of redness and swelling of the mastoid region. The most careful examination of the original or existing middle-ear lesion fails to disclose any change either in the character of the discharge, its quantity, or in the pathological changes of the tympanic cavity, ossicles, or antrum which are present and are known to have been present for a long time.

A strong neurotic element is almost without exception in evidence in these cases but is often entirely overlooked.

The presence of a foetid discharge associated with an old middle-ear lesion and the ever-present menace of grave infective brain disease in all such cases, is in these instances likewise wrongly interpreted and may lead to an erroneous diagnosis because of the excessive pain and prostration, and to an expression of opinion of unnecessary gravity of that particular case. Surgical measures when resorted to, fail to reveal an implication of the brain or its coverings or even a sudden destructive advance of the middle-ear lesion. Empyema of the cells and antrum is also found to be absent. The only discovery which forces itself upon the attention of the surgeon in such cases is the abnormally thick, brittle, and hard texture of the bone in the mastoid region with partial and, in not a few cases, total obliteration of the numerous cells of this locality.

The questions which arise are: Is the excessive suffering in cases belonging to this group explained by the hyperostosis which is often found, the presence of which was surmised before an operation was undertaken for the relief of different indications, but in which the principal object was to bring about the cessation of intense suffering which had resisted all other measures? Does the hyperostosis which is present compress sensory nerve filaments gradually or suddenly, in their passage through the sclerosed bone? Are some localities of the mastoid or other regions of the temporal bone more prone to manifest these excessive and inveterate outbursts because of the passage of important nerve trunks? Can we adopt the same explanation, that of a gradual or sudden compression of sensory nerve filaments also for those cases in neurotic or hysterical subjects in which no middle-ear lesion is present either before or at the time of the violent paroxysms? Nevertheless in just such cases sclerosis or rarefaction of the bone is sometimes found after an empirical measure to relieve a supposed inflammatory lesion which is not present; while instead, the markings of a remote pathological process are disclosed. In a smaller number again even these must be excluded and the sclerosis or rarefaction must be considered an individual peculiarity. Assuming that in these cases with a

dominant neurotic element, abnormal sclerosis of the bone is found, the point is, may we not conclude that the pain is due to mysterious impulses through the sympathetic channels and their known structural connection with the otic branches of the trigeminus? On the other hand we cannot overlook another fact, that the pain in these cases may result from a perversion of function or physiological purpose of the pneumatic spaces of the bone.

A necessary sequence of these sclerotic changes is the obliteration of the air cavities and atrophy of their lining membrane, with compression of larger nerve trunks, resulting in explosive irritation in their peripheric termination. But even though this is a speculative assumption and awaits further corroboration, *it must be admitted that sclerosis of the mastoid region of the temporal bone, occurring as the result of chronic purulent intratympanic lesions, is a frequent cause of excessive and inveterate suffering.*

The following brief account of a typical case refers to the more important clinical features.

CASE 16.—Hyperostosis (general) of temporal bone; chronic intratympanic suppuration; excessive neuralgia. Schwartze-Stacke operation. Recovery.

Mrs. McK., æt. forty-nine, Cincinnati, had had for many years chronic suppuration of the left ear. The discharge was fœtid but not profuse. It was not annoying because of the stringent cleanliness practised. There had been no perceptible increase either in quantity or character of the discharge for years. During the last six years her general health was undermined by repeated illness and nervous shock following oöphorectomy which became necessary for the relief of agonizing reflex neuralgia. About this time she began to suffer from pain in and around the left ear, but assigned this to the ovarian trouble. After the operation there was a cessation of the intense vertex headache, but the pain in the region of the left temporal bone, localized behind the auricle, became more frequent and inveterate. Her physician, during one of these violent neuralgic seizures, supposed that the old middle-ear trouble was responsible for the pain and resorted to a curettage of the middle ear. It was followed by facial paralysis. After this, without fever or other constitutional disturbance, swelling or œdema over the mastoid region, the attack persisted with increasing intensity.

After uninterrupted suffering for five days the patient was referred to me for consultation. There was no fever, swelling, or œdema, but intense unremitting pain was referred to the region of the left temporal bone and the deeper recesses of the ear. The osseous portion of the meatus was dilated, the drum and ossicles almost entirely destroyed; some discharge was present. An exploratory operation was at once advised and consented to. It disclosed extensive hyperostosis of the mastoid region with complete obliteration of the air cells and a contracted antrum. Suspecting recurring disease of the walls and tegmen of the tympanic cavity or the presence of necrosed ossicles, the middle ear was completely exposed. The same compensatory bone hypertrophy was here present also. The bone was hard and brittle and not vascular except near the external confines of the sclerosed region. The operation relieved the intense pain, and three years have elapsed without recurrence.

The recital of two similar cases is omitted because they resemble so closely the clinical aspects of this case, and exploratory surgery furnished similar findings, *i. e.*, extensive bone sclerosis with compensatory thickening of the walls of the antrum, roof of the tympanic cavity, and obliteration of the cells, but without a sudden, active participation or aggravation of the original tympanic suppuration.

Taking up, next, the disclosures of surgery in those cases in which a necrosing otitis is discovered within a sclerotic area of bone, violent and persistent neuralgic pain being one of its most conspicuous attendants, we are furnished with a more tangible proof of the cause.

It would appear that in these cases the bone hypertrophy, especially of the mastoid region, encroaches steadily upon the adjacent regions, and there excites trophic disturbances which result in a localized necrosing otitis. *The primary, chronic, middle-ear lesion may not in any way change its character either in the quality or quantity of the discharge, or in a more active participation of the lesion of the bony walls or ossicles, and this in the few cases under my observation was found.* It is evident, also, from these observations, *that the anterior wall of the epitympanic cavity and roof of the auditory canal are the localities most prone to be invaded by this variety of necrosing otitis.*

It must also be added that, owing to the slow and insidious progress of this uncommon complication, positive clinical attendants are absent. A latent course is in these cases the rule, and for this reason swelling and other attendants are absent. Pain may be a prominent symptom, and not infrequently hemorrhage, due to erosion of branches of the mastoid veins. This is especially apt to occur if the necrosing otitis encroaches upon the posterior wall of the auditory canal. If the subject belongs to the neurotic type, it is the more to be looked for, and may resist every treatment.

CASE 17.—Necrosing otitis of the anterior wall of the tympanic cavity; persistent neuralgia; vertigo; sclerosis of mastoid region. Stacke's operation. Recovery.

Mention is made of this case, a typical one of its kind, in which the degree of suffering was out of proportion to the pathological changes present. The most persistent vertigo was suffered for months at a time, with utter helplessness in consequence of the dread of its recurrence. It was also the only case under my observation in which the indication for the operation proposed by Stacke was clearly present and the operation practised strictly in accordance with his suggestion.

Mrs. J. J., æt. thirty-eight, Shelbyville, Indiana. Since childhood has had suppuration of left ear. Her general health had steadily declined during the last eight years, and persistent vertigo with neuralgic seizures which she always connected with her old ear trouble were frequent and of long duration. Every method of treatment, general and local, had been tried, only to be abandoned as insufficient.

The examination of the ear showed a meatus of wide lumen, conclusively suggesting a former destructive otitis, with disappearance of the annulus tympanicus and complete destruction of the drum and ossicles. What remained of the latter were probably firmly impacted in the epitympanic cavity. The posterior wall of the middle ear was granular, but no bone erosion could be discovered. There was no tenderness of the mastoid, except during periods of pain, nor had swelling or redness been noticed. The discharge was about as it had been for years. Syringing was impossible; even inclining the head forward or to the left side caused vertigo. She was emaciated and anæmic, and in a

pitiful state mentally in consequence of the persistent suffering and dread of attacks of vertigo.

The operation disclosed a hard, sclerosed anterior wall of the tympanic cavity and antrum, with sequestered portion of the hammer and anvil wedged in the epitympanic cavity. The bone was so hard, and in texture like ivory, that only small portions could be removed, and the operation was very tedious. After thorough exposure of the epitympanic cavity and antrum and curettage of posterior wall of the tympanic cavity, the mastoid process was opened. It was found solid. This established, no further interference was resorted to in this region.

The subsequent progress of this case was favorable, and the patient was completely relieved of vertigo which had persisted for years and the pain which had defied the skill of aurists and general practitioners.

With experience gained since then, I would invariably practise ablation of the sclerosed cortex and body of the solidified mastoid region in similar cases. The result in this case was favorable, but in the following case was not, and a subsequent operation was necessary.

The indications for the Stacke operation, as recognized also by him, have a very limited application, and in such and similar cases it would certainly be advisable to ablate the sclerosed mastoid region first, and, subsequently, the anterior wall of the middle ear and antrum—in other words, resorting to the radical operation after the Schwartze-Stacke method.

The brief history of another case, in which pain was a conspicuous and inveterate symptom, to which was added another less common, *i. e.*, persistent hemorrhage from the external meatus, resulting in such loss of blood that in consequence a more rapid decline in strength came about.

CASE 18.—Hyperostosis of mastoid; necrosing otitis; excessive neuralgic seizures. Two operations. Recovery.

Mrs. B., æt. thirty-four, Richmond, Ind., a fairly well developed woman with unmistakable evidences of former strumous disease of the glands of the neck, as evidenced by extensive cicatricial tracts and scars. Her ear trouble dates to early girlhood, during which she had other pronounced scrofulous manifestations. The left ear auricle and meatus are exquisitely sensitive at all times.

Even the ordinary inspection with speculum called forth complaints of its discomfort. The meatus was not contracted, but large. The region of the annulus tympanicus was thickened and the drum cavity so altered that a satisfactory inspection was not possible. In the posterior and upper wall of the osseous canal, the probe came in contact with denuded bone, and this was the region which it was stated was so painful during the cleansing of the ear with cotton, and from which hemorrhage occurred almost daily, often several times a day, and at night necessitated firm packing with styptic cotton. The blood was dark in color. At first it was assumed that it emanated from a tuft of granulation tissue around the outlet of a fistulous sinus in the bone, but this view had to be abandoned for this could not be discovered. A split or cleavage of the bone had taken place, and from this the hemorrhage proceeded. The discharge was foetid and thick, but not profuse. Tubercle bacilli were not found. No fever or active inflammatory symptoms were present. Pain almost persistent, breaking into more violent seizures at short intervals, and the annoying hemorrhage led her to submit at once to radical surgical measures. The operation brought interesting disclosures. Bone sclerosis in consequence of the long existing intratympanic suppuration was general. The mastoid region, especially, was solidified completely. An anomalous course of the sinus led to its exposure during the beginning of the operation. Owing to its course close to the posterior wall, the operation was modified and the method of Küster was substituted for the opening of the mastoid (Schwartz). The posterior wall was removed and the entire region exposed for inspection, followed by removal of ossicles and thorough curetting when this was necessary. The deeper recesses of the bone adjacent to the antrum and middle ear were especially thickened and hardened. In the bony meatus and extending into the roof of the tympanic cavity and forwards and upwards along the canal was a denuded necrotic area in the sclerosed bone. The subsequent course after the operation was favorable so far as the healing of the wound was concerned, but almost from the first complaints of excessive neuralgic pain with exquisite tenderness of the surface region behind and around the auricle were made. It was inferred that the sclerotic changes of the tip of the mastoid which had not been interfered with might account for the return of suffering referred to in this region, for there was absence of

every evidence pointing to an intracranial or infectious complications; a second operation was performed. The extreme tip and the adjacent region were found completely solidified and the texture brittle. Almost fourteen months have passed and the pain has not returned. There is present, however, still some discharge but not offensive. The probe readily discovers denuded bone which has not been covered by cicatrizing granulating tissue.

In this case also a neurotic element was in dominant evidence. It is probable that the anxiety and mental concentration after the first operation, because relief from neuralgia was not forthcoming at once, may have precipitated an attack such as we have not infrequent opportunities of observing among hysterical subjects.

In referring to another group of cases in which surgical experience discloses what was surmised, *i. e., rarefaction of different localities of the bone, but in particular of the walls of the mastoid antrum and tegmen tympani, we often meet with unlooked-for revelations.* This is not always due to erosion. In some cases it is simply an absorption of the walls and dilatation of the cavities in consequence of pressure from the filling up and *complete choking with cholesteatomatous masses, the result of wholly latent grades of low inflammatory activity.*

The gradual and ceaseless growth of these dermoid products with caseated and inspissated pus, is, wherever and whenever it is found, a grave menace to the resistance of the osseous walls of these cavities, into which they have been transplanted. These spaces become retention cavities, and a yielding of the walls, even if compensatory hypertrophy may have preceded it, is inevitable. The most treacherous cases of intratympanic suppuration are those in which the destructive activity is, neither at first or throughout its long course, complete, and in which the drum is only in part destroyed and the ossicles ulcerated only, but not sequestered. The principal, often the only complaints, are the increasing deafness and a fœtid otorrhœa.

CASE 19.—Chronic intratympanic suppuration of both ears; ingrowth of secondary cholesteatomatous products of mastoid antrum

and tympanic cavity. Double Schwartze-Stacke operations. Recovery.

The patient, Miss M., of Jackson, O., æt. twenty-nine, was a frail and delicate woman. The family history and her appearance suggested a tuberculous trouble. She was emaciated, and had persistent cough and fever. Physical examination of the chest, made by her family physician and a specialist, failed to confirm this inference.

Examination of the discharge from the ear also failed in the discovery of tubercle bacilli. The deafness, which had been pronounced for years, steadily increased, and at the time of her first visit to me she could only hear loud conversation when spoken directly into the ear. The discharge, which had never been copious, was offensive. In both ears extensive destruction of the drum and ossicles had taken place, and the tympanic cavity was filled with cholesteatomatous masses. The radical mastoid operation, to expose and clear the epitympanic and adjacent cavities and to meet other needs which an operation alone could disclose, was proposed and practised.

It was found that sclerosis of the mastoid region had taken place, and all except the posterior pneumatic cells had disappeared; that the antrum was much dilated and packed with the masses mentioned. The tympanic cavity was exposed for inspection, followed by removal of the ossicles and masses of firmly packed layers of cholesteatomatous products. Recovery was uneventful, and the restoration of hearing was an agreeable surprise. She was, before the operation, helpless, in consequence of the deafness; afterwards she could hear ordinary conversation at a distance of four feet. The right ear was, after an interval of several months, treated by the same Schwartze-Stacke method, but restoration of hearing was not achieved. The patient has gained in health and strength.

In another case a more striking illustration of the treacherous course was observed.

CASE 20.—Secondary cholesteatoma; extensive erosion of tympanic attic and antrum; erosion of sigmoid groove and exposure of sinus. Operation (Schwartze-Stacke). Recovery.

M. M., æt. thirty-four, Cincinnati, has been under my observation for ten or twelve years. She had a fœtid otorrhœa from the left ear, but never any pronounced complications of the bone or

periosteum ; finally vertigo so persistent and annoying that she was rendered helpless in consequence, and only after these symptoms were added did she consent to an operation. The Schwartz-Stacke, or radical mastoid, operation was performed. Dense sclerosis of the cortex was disclosed, with here and there only, a contracted pneumatic cell, with leaden-colored lining membrane. The antrum was packed with cholesteatomatous masses, absorption of the tegmen and exposure of the dura had occurred, but there was no epidural accumulation of pus. The roof of the tympanic cavity was also eroded and the dura exposed. The anterior wall of the epitympanic cavity was found abnormally thickened. After the removal of ossicles and cholesteatomatous masses, the epitympanic cavity was found much dilated and, as already stated, the tegmen tympani was gone and the dura exposed. The entire region was exposed for thorough inspection and for the most complete removal of the pathological products within the cavities, and for surgical treatment of the walls. The sinus was laid bare for inspection, but it was intact. Permanent facial paralysis followed the operation. This was not surprising, as the entire posterior wall of the middle ear was eroded. Aside from this, recovery, though tedious, was favorable, with complete cessation of vertigo.

As surgical experience adds to our knowledge of these treacherous complications of chronic intratympanic suppuration, it will enable us to assume with more reasonable certainty, at a much earlier stage, the presence of bone sclerosis or rarefaction, or both, in a larger number of cases belonging to this group. In just this class of cases there is a wide field for exploratory surgery, if discriminately selected. This will at once direct measures which, if practised with thoroughness, are certain to avert lurking dangers which will otherwise inevitably follow.

EXTENSIVE LACERATION OF THE AURICLE AND
COMPLETE SECTION OF THE EXTERNAL AU-
DITORY CANAL, WITH PARTIAL DETACHMENT
OF THE STERNO-CLEIDO-MASTOIDEUS TENDON
AND SPLINTERING OF THE TIP OF THE MAS-
TOID, BY A BLOW FROM A BRICK—OPERATION
FOR RESTORATION OF THE AURICLE AND
CANAL.

BY SWAN M. BURNETT, M.D., PH.D., WASHINGTON, D. C.

(With 1 figure in the text and Figure 2 on Text-plate I.)

INJURIES to the auricle are very infrequent as compared with injuries about the other parts of the head and face. At the Emergency Hospital, Washington, where, on an average, 1500 wounds and injuries of all kinds to the head and face are treated annually, it is rare that an injury of any sort to the auricle is recorded. The clientele of the institution being recruited largely from the colored population, occasional cases of biting or "chewing" of the auricle are met with, but frequently a whole year passes without the record of a single incised wound of the auricle being made. This seems remarkable considering the prominence of the ears on either side of the head, equally prominent with the nose, and yet among these 1500 cases there is an annual average of 18 cases of fracture of the nose recorded. The disproportion is no doubt due, in some measure, to the fact that in falling or fighting the face is more commonly towards the point of danger, and in some measure to the elasticity of the auricle. We find the same infrequency of injuries to the auricle in the reports of special institutions. Thus taking

the last annual reports (1898) of the Manhattan Eye and Ear Hospital, of the Massachusetts Charitable Eye and Ear Infirmary, the Brooklyn Eye and Ear Hospital, and the New York Ophthalmic and Aural Institute, aggregating 13,565 ear cases, there are but 7 cases of wounds or injuries to the auricle tabulated, and no operation for injured auricles is mentioned. Formerly, when the sword and sabre were in common use in warfare and personal encounters, cuts of the auricle, or its entire removal from the head, were not uncommonly met with, and the duelling custom in the German universities has led to many incised wounds of the organ. With our more modern methods of conducting war, however, the auricle has almost entirely escaped, though Sexton has found among the records of the civil war 7 instances in which the auricle was cut off by large projectiles, and two cases of great mutilation of the auricle by musket-balls. He also saw, during his service in the war, a few sabre wounds of the auricle. He likewise records some cases of arrow wounds of the auricle.

As a rule, our standard text-books give but scant consideration to wounds of the auricle and external auditory canal, and that usually at second hand. Moreover, very little is said in a definite way about operations for restoration of the external auditory canal after its section by traumatism.

The conservative treatment of all injuries to the external auditory meatus must hold as its cardinal feature the preservation of the lumen of the canal. If this is not adhered to, though the operation may be surgically a perfect success, it is functionally an utter failure.

In this connection I consider the following case worthy of being placed upon record:

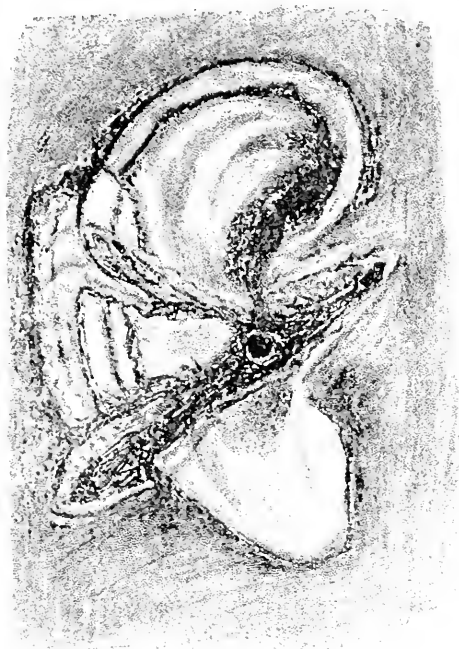
Mr. D. A. S., aged sixty-three, was struck, on the 9th of August, 1898, on the right side of the head by a brick thrown by a negro man with whom he had some misunderstanding. He was knocked down by the force of the blow but did not lose consciousness, though badly stunned.

He was carried to the Emergency Hospital and I saw him at 12.30 p. m. I found the auricle completely divided into three distinct parts, separated by large gaping wounds. The principal

wound ran obliquely from above forwards, downwards and backwards; starting one and a half inches in front of the tragus, passing just above the tragus across the meatus auditorius externus, and the antitragus, and terminating at the tip of the mastoid. The other wound passed upward and backward from this, beginning at the position of the meatus externus and extending entirely through the auricle and denuding the cartilage of the central piece of its integument on its outer half. The bottom of these wounds was formed by the denuded bone. The external auditory canal was represented only by a small round hole in the depth of the wound. It had been completely severed at the junction of the cartilaginous with the integumentary portion. Figure 1 gives a good idea of the condition. Unfortunately, the photographer to the Lionel Laboratory was absent, and no photograph could be taken. This drawing was made from sketches taken at the time. A closer examination revealed a severance of the sterno-cleido-mastoid from its attachment to the tip of the mastoid for at least one half of its extent, and an extensive shattering of the bone, several large pieces of which were adherent to the tendon of the muscle and retracted by it deeply into the cavity of the wound. The whole of the mastoid at this place was laid bare, as was also the bony wall of the external auditory canal and the adjacent parts.

The patient was put under the influence of an anæsthetic. It was first necessary to free the mastoid tip and the tendon of the sterno-cleido-mastoideus from the bone splinters. This was found to be no easy matter, for the bone was so strongly adherent to the tendon as to necessitate the cutting off of a portion of the tendon with the splinters attached. The next endeavor was to reconstruct the external auditory canal. No semblance of the cartilaginous portion of the canal was left, and it only remained to fashion one from the tissues of the widely separated parts with but little to guide as to the former normal relations. By patient trying, however, it was possible to bring the upper portion of the wall, which was least dislocated, into line, and by a very small and very sharply curved needle it was sutured to the remaining portion of the canal. Having now obtained a *point d'appui*, the middle fragment was fitted to this and another suture introduced, fastening it also. The lower fragment was now brought up into place. The difficulties of suturing this were the greatest of all on account of the narrowing of the space caused by the other sutures

and the greater raggedness of the wound's edge. The suture, however, was finally applied and the canal restored with approximately its normal lumen. Two sutures united the wound in front of the auricle. The fragments of the auricle were then brought together by a sufficient number of sutures through the skin, the large flap of integument which had been torn from the anterior surface of the middle fragment, and which hung over the back of the cartilage, being brought over and fitted into place.



The wound over the mastoid was closed after having been packed with iodoform gauze, leaving a drainage space at its lowest part. The re-formed auditory canal was filled with a roll of iodoform gauze. The restored auricle was supported carefully on pads of sterilized gauze and the whole covered with a light bandage.

It was feared that the effect of so serious a blow might not have been limited to the mastoid, but have extended to the base of the skull, and for this reason the patient was to be carefully watched. There was no notable rise in the temperature, however, nor any other untoward symptom, and on the fourth day, when the dress-

ings were removed for the first time, no pus was found. The hearing on that side was not abolished, though less acute than in the other, showing no injury to the nervous apparatus.

The rest of the history is short. It followed the usual course of injuries to the bones and soft parts in a person of his age. There was a slow filling up of the cavity over the tip of the mastoid, and a fistula which extended over the denuded bone from this to the sutures in the lower part of the re-formed auditory canal. This, however, healed with no suppuration, except for a brief interval, due to an accidental infection, and which was stopped by strong solutions of nitrate of silver. At the end of two months the cure was complete, with a lumen of the canal but little less than that of its fellow. The condition of the auricle is shown in the accompanying figure (2) made from a photograph taken at the time. His hearing for the watch is about the same on each side, namely, six inches, but his hearing for the voice is better and more distinct on the injured side. The vertex T.-f. is heard loudest in the right, the injured, ear.



FIG. 2
Case of Extensive Laceration of Auricle, etc. Result after Operation.



FIG. 3
Case of Sarcoma of the Frontal and Ethmoidal Sinuses.



SARCOMA OF THE FRONTAL AND ETHMOIDAL SINUSES.

By SWAN M. BURNETT, M.D., PH.D., WASHINGTON, D. C.

(With Figure 3 on Text-plate I.)

SARCOMATA of the accessory sinuses, while not among the extreme varieties, are yet sufficiently uncommon to warrant the publication of another case as a contribution to the more complete study of the disease.

Mr. L. S., aged fifty-seven, a rather vigorous-looking veteran of the civil war, consulted me on the 27th of April, 1897, on account of a swelling at the upper-inner angle of the right orbit, which he had first noticed as a small lump about the middle of the previous February. The swelling, which had gradually increased in size, had not been attended with any considerable amount of pain, though it was somewhat sensitive to pressure. The tumor had now attained to such a size that its apex extended one centimetre beyond the bridge of the nose, and it was encroaching on the forehead above and extended laterally to near the centre of the orbital arch. The upper lid was œdematous and hung down over the eye, covering the pupil most of the time. The eyeball itself was displaced downward and outward but not noticeably forward, and its movements were restricted. There was a diplopia when the pupil was uncovered corresponding to this displacement. The diplopia had first come to his attention on the 25th of last March. Vision in this eye $\frac{5}{20}$; in the left $\frac{5}{16}$. There was no deficiency noted in the visual field of the affected eye. The fundus of the eye was not different from that of the unaffected eye. Some weeks previously Dr. C. R. Dufour had removed some polypi from the right nostril which, on microscopic examination, were

found to be of the ordinary mucous variety and contained no sarcoma cells. There had been no injury to that region, and the trouble in the nose was the only antecedent history of disease, and how long this had existed could not be definitely ascertained. He slept and ate well. A more careful examination of the tumor showed it to be rather soft, and about one centimetre above the orbital edge, and at this same distance to the right of the medial line the rough edge of a deficiency in the frontal bone was felt.

Operative interference having been decided upon, he was sent to Providence Hospital, and on the 30th of April, under ether, an incision was made horizontally across the tumor just under the brow. No pus or other fluid escaped, but there was immediately exposed a mass of soft but fairly consistent reddish material which was easily broken down by a spoon or the finger nail. This was removed, first with a sharp spoon, and later, as the depth of the cavity was reached, by means of the little-finger nail of the right hand, this being considered safer than any insensitive instrument. A very large cavity was thus revealed, involving the frontal sinus of the right side, very much distended, and extending through the septum to the left sinus. Backward it invaded the ethmoid, the entrance to which was marked by a ragged opening in the bone a centimetre or more in diameter. The little finger extended in these explorations beyond the second joint. There was an almost circular deficiency in the outer layer of the frontal bone, a centimetre in diameter at about that distance above the edge of the main opening; the bone between the two openings, being loose, was removed. No opening was found in the walls of the orbit. The diseased tissue was removed carefully, everywhere going down till bare bone was reached, the operation requiring an hour. The cavity was then thoroughly washed out with boiling water, and afterwards packed with iodoform gauze. May 1st; rested well and feels comfortable. Blood and mucus came from the left nostril, none from right. May 2d; dressing removed and cavity repacked with iodoform gauze. Temp. normal. May 3d; temp. 101° last night, but fell to $97\frac{1}{2}^{\circ}$ this morning. May 4th; temp. normal. From this time on the general condition of the patient was fairly satisfactory, though the local disease showed no signs of improvement. The cavity soon began to refill, and on June 8th was as is shown in the figure, which was about the appearance at the time of the operation.

An examination of the tissue removed, made at the Lionel

Laboratory of the Emergency Hospital, having shown that it was a round-celled sarcoma with rather more than usual vascularization, it was decided unwise to attempt any further operative interference. He left the city on June 30th, and I did not see him again.

The further history is contained in the following extract from a letter received from Dr. Wm. L. Schutter of Albany, N. Y., under whose care he was at the time of his death.

"After he left Washington the disease followed the usual course, breaking down and discharging continuously with consequent emaciation and weakness until August 16, 1897, when he had nine convulsive seizures. On the 18th he had three more, and after that lapsed into a torpid condition, which was followed by a comatose state, and finally by death on September 8, 1897."

No autopsy was obtained.

FRACTURE OF MALLEUS AND ANNULUS TYMPANICUS.

BY FRANK ALLPORT, M.D., CHICAGO, ILL.

THE report of Pritchard, in *Kings College Hospital Reports*, for 1897, of a case of fracture of the handle of the malleus, due to indirect violence, leads me to report a similar instance occurring under my own observation.

Mr. S., age about forty, thrown from carriage, followed by prolonged unconsciousness and aural and nasal hemorrhage. Quickly seen by family physician, Dr. F., who cared for patient generally. He observed rupture of left drum membrane, and treated ear on strictly antiseptic principles, with the result of a speedy closure of the wound. I saw the case, perhaps two weeks after the accident. Patient somewhat dizzy and pale. Watch not heard on contact, but hears moderately high and loud voice. Tinnitus and muffled sensation in left ear. Eustachian tube open. Drum membrane congested and retracted. Handle of malleus fractured. Line of fracture plainly seen. Fractured end displaced inward. Upper and posterior portion of annulus tympanicus also fractured, as seen and felt by sharp line of disunion. Treatment has been, frequent middle-ear inflation, and suction by Siegle's otoscope. Result, good, six months after accident. Fracture lines still visible. Drumhead occasionally congested. Watch 20-24. Whisper, 30 feet. Occasionally muffled and stuffy feeling in ear.

THE OPERATION FOR OTITIC BRAIN-ABSCESS WITH SPECIAL REFERENCE TO ITS CURA- TIVE VALUE.

By DR. F. RÖPKE, SOLINGEN.

Abridged and Translated by DR. ARNOLD H. KNAPP, New York.

THOUGH scarcely any difference of opinion on the indications and methods of operating for otitic brain-abscess exists at the present time, the true curative value of the operation is not universally accepted. The possibility and justification for the operation of an otitic brain-abscess was established by the publication of successful cases at about the same time by both German and English surgeons. The difficulty, and in fact the occasional impossibility of a correct diagnosis became more and more apparent in subsequent years. The question, when should we and when may we trephine in search of a presumable abscess was not clearly answered for a number of years. The first operations for otitic brain-abscess in 1886 were undertaken from the appearance of general symptoms of brain irritation. Bergmann, three years later, restricted the indications for operation to cases where distinct focal symptoms were present. A great step in advance was made by the discoveries of McBride,¹ and Körner.²

¹ MCBRIDE and MILLER: "The Diagnosis and Treatment of Cerebral Abscess Due to Ear Disease." *Edinburgh Med. Journal*, vol. xxxii., pt. I, 1887.

² KÖRNER: "Statistical Contribution on the Otitic Brain-Abscess." *Arch. f. Ohrenhkk.*, vol. xxix., 1889.

Among the many excellent publications on this subject the following two deserve the first mention:

MACEWEN: *The Pyogenic Infective Diseases of the Brain and Spinal Cord*. Macmillan & Co., 1893.

KÖRNER: *Die Otitischen Erkrankungen des Hirns*, etc., 2d edition. J. Alt, Frankfurt-a-M., 1886.

McBride made the statement that most temporo-sphenoidal abscesses were situated directly over the tegmen tympani. Körner advanced the same thesis and added the important statement that the majority of cerebral abscesses stood in direct communication with the primary diseased focus. Thus the indications for the operation of cerebral abscess were greatly broadened. Körner mentions in this publication that the uncertain opening of the skull over the supposedly diseased part of the brain should be replaced by the systematic search for pus in the brain by the same way as the morbid process extends from the affected ear and temporal bone to the brain.

At present it is generally believed that the otitic brain-abscess runs an acute or subacute course. Macewen found that the otitic brain-abscess runs a more rapid course than the traumatic, and Oppenheim concludes from a study of the cases that only a small part of the otitic brain-abscesses are to be classed as chronic.

The rapidly increasing number of observations on this subject show that the otitic brain-abscess runs a rapid course and develops in a comparatively quick time from the beginning of the ear disease. Our list of operative cases shows that 26 cerebral abscesses followed acute otitis, while 109 followed the chronic otitides.

According to our statistics cerebral abscess occurs in the following decades of life:

0-10 years, 24.

11-20 years, 33.

21-30 years, 36.

Over 30 years, 30.

Thus the greatest frequency is found in the second and third decades.

As regards the sex, 83 males and 41 females were affected.

The abscesses occurred 66 times on the right side, and 67 times on the left.

If signs of brain compression are added to an otorrhœa with symptoms of brain irritation, the diagnosis of brain abscess is assured. Several authors have shown that aside

from brain tumors developing in cases of otorrhœa, focal symptoms may appear in other intracranial suppurations. Moos found aphasia in a tubercular meningitis of the convexity; Jansen found optical aphasia in a circumscribed inflammation of the meninges and cortex at the lower surface of the left temporal lobe; Salzer, Pritchard, and Macewen noted disturbances of speech in epidural or subdural abscesses, and Salzer anæsthesia and muscular contractions in the opposite half of the body. These cases are, however, infrequent, for Grunert did not find in twenty cases of extradural abscess a single case of crossed paralysis, disturbance of sensibility, or aphasia. In general we may safely open the cranial cavity after the mastoid operation, and puncture the brain, in cases where symptoms pointing to a focus in the temporal lobe exist with otorrhœa.

In cases where a brain abscess is suspected, though focal symptoms are not present, operative interference will depend on the severity of the symptoms. A patient in coma with any suspicion of a brain abscess would of course be immediately operated on and the brain incised. In cases where the symptoms point to a very rapid course of an intracranial suppuration, we must trephine immediately for fear of the rupture of the rapidly growing abscess into the ventricles or meninges. Moreover, the primary ear-trouble must not be neglected.

In those cases where the disease is more latent, a radical tympano-mastoid operation may first be done; the further steps depend upon the findings at the operation. Caries, fistula, or defects in the bony roof of the tympanum would naturally call for a free opening into the middle cranial fossa and a search for extradural or intracerebral suppuration. If the morbid process does not extend to the dura, the result of the radical operation can be waited for, as it is not unusual to see general brain symptoms without intracranial suppurations. If, after the exposure of the middle-ear cavities, irritative brain symptoms continue, we must open the middle or the posterior cranial fossa; if the extradural condition is negative, we may again wait for results before investigating the brain. Such general rules are, how-

ever, not applicable to all cases, and everyone will encounter cases where he is entirely at a loss.

Methods of Operating.

Macewen, in 1881, was the first to operate for and evacuate cerebral abscess after ear disease, from the brain symptoms and without the guidance of an external fistula. Subsequently other abscesses were operated on from the squama, until the year 1889, when Küster's publication of the radical operation of the middle-ear cavities, so closely connected with the operation for brain abscess, appeared. Körner in the same year recommended the systematic search for brain abscesses in connection with the radical operation, by attacking the base of the temporal lobe through the tegmen tympani. This method was carried out successfully by Schede in 1891. Macewen had made a counter-opening through the tegmen tympani, for drainage, four years previously. Quite a large number of authors have opened the abscess from the tegmen, some independent of Körner, others following his views. Some do not recommend this method for all cases. Schwartze thinks it rational only when fistulæ pass directly into the cranial cavity. Macewen confines himself to no single method, but operates from the tegmen or the squama, or combines them both.

On the whole, 81 abscesses were evacuated from the squama, 43 from the tegmen tympani; in 7, two openings were made, and in 6 cases fistulæ were present in the squama.

Kretschmann believes the opening of the abscess from the tegmen tympani to have the following advantages: 1. The operation is but an extension of the usual radical operation. 2. The abscess is opened at its deepest part and drainage is best. 3. Large branches of the meningeal artery are not encountered. 4. The operation leads with considerable certainty to the abscess. 5. After healing no protection is required because of the hidden position of the bony defect. Körner thinks that an additional advantage is that the danger of an arachnitis is lessened as the meninges and brain are frequently adherent round about the diseased

bone. On the other hand, Schwartze and others believe that this method is not admissible in cases of uncertain diagnosis and absence of caries or of fistula in the roof of the middle ear, because in cases of mistaken diagnosis an infection is too liable from the proximity of the primary focus. I also think that the danger of infection is very great in such cases, and that the trephine opening in the squama is a much safer procedure. If then an abscess is found, a counter-opening through the tegmen tympani should be made. In abscesses which are evacuated through the tegmen tympani, a counter-opening through the squama should be made, if from the history or the findings at the operation a very virulent infective process is supposed to be present. The counter-opening can also be made later if difficulties from pus-retention, etc., should arise during the after-treatment. As will be seen later, excellent results have been obtained by this double opening of the abscess cavity.

The technique of the operation for brain abscess is comparatively simple. For those acquainted with the performance of the radical operation, the opening of the cranial cavity and an abscess does not present any particular difficulty. German surgeons employ the hammer and chisel in exposing the middle-ear spaces, but Macewen prefers the rotary burr. I cannot agree to the advantages claimed for the burr. Concussion, fissures in the tegmen tympani, or perforation of an abscess into the ventricles or meninges are surely exceeding rare if a sharp chisel is employed. For exposing the dura, the chisel is also the most practical instrument. A bone forceps can then be used to enlarge the opening. The chisel and hammer are also superior to the trephine, as the opening can be made of any size, which is of especial value when an extradural abscess or diseased conditions of the dura are encountered. If the dura is diseased (discoloration, granulations, purulent deposits), it is exposed until healthy dura is seen on all sides. The dura is then cleared of pus or granulations, and fistulæ, especially over the tegmen tympani, must be searched for. If a fistula is present in the dura it will lead to the possibly existing abscess, and the pus can be evacuated by dilating the fistu-

lous tract. The danger of an arachnitis is excluded on account of the surrounding adhesions. When no fistula exists, and it is desirable to explore the brain, puncture through the dura is unsuitable, as it does not permit any inspection of the field of operation and may lead to errors in diagnosis, and if the dura is diseased infection may be carried on. Most authors then incise the dura and examine the subdural space and the brain cortex. This may be done with a crucial incision or a curved incision, permitting the retraction of a flap. Puncture of the brain was at first always done with an aspirating needle or a trocar. Bergmann then recommended the use of the knife, and showed the harmlessness of this procedure. Schwartz, Körner, and others also prefer the knife. Macewen uses a canula with lateral openings.

After retraction of the dura, the site of the puncture may be suggested by the conditions found. It was noticed in some cases that the brain over the abscess bulged outward. If nothing is visible, puncture can be made in the centre of the trephine opening. A number of punctures can be made. In one of my cases I did not evacuate the abscess until on the fifth puncture, and in Stoker's case the attempt did not succeed until the ninth time. The abscess was so exactly localized in only a few cases that the site and direction of puncture were determined from the diagnosis.

Hansberg has experimented how deep we may safely explore the temporal lobe. He says that the smaller the skull the more superficial is the inferior horn, and the greater caution is necessary. In general three centimetres' depth is the limit.

After the abscess has been opened, it should be exposed as fully as possible, to determine its size, contents, and character of lining wall. The head of the patient is turned to facilitate the drainage, and necrotic brain tissue and thickened pus should be removed with gauze swabs. The abscess membrane, if present, should be removed if possible. If this succeeds, the cavity can be lightly packed with gauze; if not, and this is the most usual, the cavity can also be packed with gauze if the walls are smooth, otherwise a drainage tube must be inserted and the wound irrigated.

A counter-opening should be made through the squama or through the tegmen, or it may be sufficient to drain and irrigate the abscess if it has no membrane and the surrounding brain tissue is inflamed. Irrigations are best made with a physiological salt solution, or a two per cent. boric acid solution.

These manipulations must be performed with the greatest caution. The gauze is to be loosely packed, the drainage tubes carefully inserted, and but little pressure used in irrigating. In removing the abscess membrane the instruments must be very carefully handled. We should always bear in mind the proximity of the lateral ventricles to large abscesses; an injury to the ventricle is, of course, dangerous to life.

Macewen employs drainage tubes of decalcified chicken bones; others use tubes of rubber, metal, or glass. It is evident that the openings should be large.

After the abscess has been cleansed, the brain surface, dura, and the wound in the bone must be disinfected. Macewen dusts boracic-acid iodoform powder on the wound surface. Jansen applies a moist boric-acid dressing.

The dressings are to be changed according to the amount of the discharge and the condition of the patient. Gauze packing may remain a week if the patient otherwise does well. If the patient's condition should change for the worse the wound is first to be thoroughly inspected and any retention of pus searched for. A second abscess in the temporal lobe, or disease in the posterior fossa of the skull, must be thought of, if the symptoms should recur. If then, after opening the posterior fossa, no extradural abscess or disease of the sinus is found, another abscess should be looked for in the cerebellum or the cerebrum, according to the symptoms. In case of doubt, it would be best to puncture the walls of the old abscess, as in several autopsies secondary abscesses have been found in the immediate vicinity of the first. Cases have also been described by Manasse, Seligman, and Macewen where a second abscess had perforated the first.

The drainage tube is gradually shortened, and the opening

is kept dilated as long as there is any discharge. Granulations at the opening and at the edges should be removed.

A hernia of the brain may occur after the operation. Any necrosed brain tissue on the prolapse can be removed.

An unfortunate complication is when the cerebral hernia hides the mastoid cavity, as it makes careful after-treatment of the large wound in the bone impossible, and a constant source of infection is kept up.

The patient should be kept in bed until the abscess is closed. The diet should be carefully supervised. Constipation usually persists after the evacuation of the abscess; laxatives can be given after one week.

Can an otitic brain-abscess disappear spontaneously?

The course of an otitic brain-abscess is usually acute or subacute. In many cases the abscess will break into the ventricles or in the meninges after a few days or weeks, and cause death. It is, however, not uncommon that the course is slower and that the growth of the abscess may come to a standstill; then the virulence of the infection is so slight as to permit the formation of a limiting wall. If the brain tissue surrounding the encapsulated abscess is fairly normal, an absorption may take place, though no cases of exactly this character have been observed. The abscess membrane may undergo a change, as, for instance, chalky degeneration; it is not known whether the contents of the abscess take part in this calcification or not.

Cysts have been found in brains of persons with old purulent otitis, and some authors regard them as old otitic abscesses. Macewen found a thick-walled cyst floating in a brain abscess, which he considered to be an encapsulated brain abscess. Saenger operated on a cyst with sero-hemorrhagic contents in the posterior central convolution in a child suffering from an old otorrhœa and caries of the temporal bone, which he thought represented an old abscess.

Occasionally brain abscesses have made a more or less complete way to the surface. In the two cases from the early literature of the subject, fistulæ in the squama led to the abscess. It is also not uncommon for abscesses to communicate with the external surface by fistulæ through

bony defects in the roof of the antrum or tympanum. Brieger noticed a case where an abscess of the temporo-sphenoidal lobe had emptied itself through a fistula in the tegmen. Sutphen found at an autopsy the complete disappearance of a cerebellar abscess which had spontaneously perforated the skull. It has already been mentioned that abscesses may evacuate their contents into abscess cavities which had been opened. Brain abscesses have also been known to empty themselves into the mastoid wound made at operation. With the exception of a few cases, the patients, where the abscess found an external outlet, nevertheless died, if the pus did not receive a better opening from the surgeon's hand.

Results of the operation for otitic cerebral abscess.

The statistics of cases with results of operation may give a false impression, as a number of unsuccessful cases have not been published; again, cases reported as cured have not been observed for a sufficiently long time. I have, therefore, written to all the authors that have published successful cases, for information as to the subsequent history of their patients.

Schwartz and Broca et Maubrac estimate in their textbooks the number of cases cured by operation to be 50%. Oppenheim found 104 cerebral abscesses which had been operated on in the preceding year with 48 recoveries (46.1%). Körner's very accurate statistics show:

1893:	56.5 %	recoveries.
1895:	55.3 %	"
1897:	50.4 %	"

I have been able to collect 142 cases operated on for cerebral abscess; of these, 59 patients can be considered cured as regards life; in 82, death occurred a certain length of time after operation; and in 1, the result is unknown.

Of those that died:

Six succumbed to accidents in connection with the operation; perforation of the opposite wall of the abscess by the drainage tube, post-operative hemorrhage, shock, asphyxia, hemorrhage during and after the operation, the trocar had reached but not evacuated abscess.

Five succumbed to perforation into ventricles existing before the operation.

Seven to perforation into ventricles after operation. These were complicated by : basilar meningitis, softening of frontal lobes, diffuse meningitis, softening of temporal lobe, extensive encephalitis, meningitis and encephalitis, progressive encephalitis.

Seven to meningitis existing before operation.

Ten to meningitis after operation.

Eight to encephalitis and meningitis ; one of these was complicated with sinus thrombosis.

One to a second, undiscovered abscess.

One to meningitis and a second abscess.

Eight to encephalitis and secondary abscess.

Six to sinus phlebitis and pyæmic metastases.

One to cerebral hernia and subsequent meningitis.

Two to fresh abscesses.

One to apoplexy.

Three to pneumonia, complicated by cerebral hernia ; second abscess, necrosis of cerebrum and sinus thrombosis.

One to abdominal disease and cerebral hernia.

One, no cause found at autopsy.

Five, no cause for death given.

Four, autopsy not allowed.

Most patients died in the first few days or weeks after the operation. Nineteen patients died one month or later after the operation as follows :

One perforation into lateral ventricle (one month after operation).

Eight from meningitis after operation, at following intervals : two months, one year, four and a half weeks, five weeks, two months, three months, four months, two and a half months.

Two from new abscesses.

Three from encephalitis and second abscess.

One from encephalitis and meningitis.

One from apoplexy.

One from pneumonia (six weeks).

One from cerebral hernia and abdominal disease (half year).

One, no cause mentioned (two months).

Aside from the six cases of accidents occurring at the operation, the fatal complication existed in half the cases at the time of the operation. In the greater part of the remaining half the operation could not prevent the extension of the process; in a small fraction of cases, meningitis followed the operation.

Of the cases considered cured, eight subsequently died. In one case, a relapse occurred one year after the operation, though the primary ear-disease was healed. Death occurred from basilar meningitis. In the other seven cases the fatal complication set in two, three, four, and six months after the first operation.

In the 82 fatal cases, the mastoid operation was performed in 60; was not performed in 10; no mention made in 12.

Before entering upon the summary of the cured cases, I should like to discuss the way in which the abscess cavity heals, and after what length of time the process of repair may be considered complete.

After the abscess is emptied, the compressed brain tissue tends to expand. The cavity in acute abscess may be obliterated in a few hours, as Macewen has shown. Older abscesses, with a distinct lining membrane, and where a part of the brain tissue has been destroyed, take much longer, and heal by proliferation of brain tissue and granulations. The termination is a scar in place of the abscess. Autopsy reports describing the anatomical changes during the healing process are very scarce.

In Bramwell's case the large abscess cavity had contracted so completely that it could hardly be discovered, post-mortem, ten days after evacuation. This confirms Macewen's statement. Schubert found a scar at the place of a temporal abscess, five weeks after operation. Bergmann found in a case of traumatic abscess of the frontal lobe, six weeks after operation, a defect in the white matter surrounded by soft reddish tissue. Macewen found in a case of superficial abscess of the temporo-sphenoidal lobe, which had been

operated on, forty-seven days later, granulations at base of temp.-sphen. lobe leading with connective-tissue bands into the brain substance, where some folded-up scar tissue was situated, surrounding a small bead of granulation with a drop of pus. Gussenbauer, seven months after opening a traumatic frontal abscess, confirmed complete cicatricial obliteration of the cavity. In a case of Barker's, an area of pigmentation marked the site of a temporo-sphenoidal abscess, operated several years previously.

The healing process of brain wounds has also been studied on animals. Tedeschi, after resecting parts of the cerebral hemisphere, found that the wound would be healed in 150 to 200 days—that is, a complete cicatrization. To a certain extent the process of repair after resection of parts of the brain can be compared to that going on in abscess cavities. I think that it is justifiable to consider the healing of an abscess cavity from the time of evacuation to be complete in one year. The reported autopsies, and especially the fact that no relapse was noted after one year, together with these interesting experiments on animals, are the basis for this assumption.

Of the 141 operated-on cerebral abscesses, only 59, *i. e.*, 41.8%, satisfy this condition.

I have been able to collect 33 cases of operation for cerebellar abscesses, with 16 recoveries (46.4%). This does not by any means prove that the prognosis of the operation for cerebellar abscess is more favorable, as I am quite sure that of the cases of cerebellar abscess published as healed, not all would comply with the above-mentioned conditions.

Of the 59 cured cases operated on for cerebral abscess, 42 are now *surely* still living. The date of the operation is as follows:

1	in	year	1885
1	"	"	1887
2	"	"	1888
2	"	"	1889
1	"	"	1890
6	"	"	1891
5	"	"	1892

3	in	year	1893
2	"	"	1894
2	"	"	1895
13	"	"	1896
4	"	"	1897

The following 8 patients are *probably* living :

One operated on in year 1886 was well for a long time after operation, then lost track of.

One in year 1888 was seen for the last time three years after operation.

One in year 1888 was last seen in 1897.

One in the year 1890 address unknown, though was living for some time after operation.

One in the year 1890 was last seen in preceding year.

" " " 1891 was well one year after, then lost sight of.

One in the year 1892 was seen $3\frac{1}{2}$ years after.

" " " 1893 was seen four years after.

One case (Barker's) died of pulmonary tuberculosis several years after operation, without appearance of any cerebral symptoms. I have not been able to obtain any information of the remaining nine cases.

The course of healing was generally smooth. In twelve cases during the after-treatment, another operation was necessary on account of threatening symptoms. In a case of Gradenigo's the necrosed cochlea was exfoliated under severe symptoms; in another case of the same author pyæmic fever set in, originating presumably from a cerebral hernia as the sinus proved healthy. Heiman had a case where intermittent fever persisted which finally proved to be malarial. Macewen opened a second abscess thirty-eight days after the first operation; in another case he was compelled to explore the abscess cavity for a second time, two and a half months after the operation, and found pus in the old cavity and presumably a circumscribed arachnitis.

In two cases after-treatment was disturbed by a large cerebral hernia. Stephen had to operate again after ten days on account of recurring focal symptoms. Retention of

pus caused threatening symptoms in two cases. In two cases of which mention has already been made, a second abscess evacuated into the abscess cavity.

In thirty-five of the fifty-nine cases cured as to life, the primary ear-trouble was healed; in four the otorrhœa still persists. I received no information regarding the condition of the ear in twenty cases.

Ten patients suffered from a transient or permanent disturbance, due to the operation. Avoledo's patient experienced severe headache during the first year after operation, was slow at his work, and was generally very much changed. He is at present physically and mentally sound. Barker's second patient suffered from severe trigeminal neuralgia on the operated side. This neuralgia was a symptom before the operation. In Cheyne-Pritchard's case, aphasia persisted at first; patient complains now of headache and his intellect is weak. Four years ago he had one epileptic attack. In Knapp's case the otorrhœa continued until two years after operation; the girl is healthy but for an homonymous hemianopsia. Lindh's patient had an attack of vertigo lasting four hours, three years after operation. In February, 1888, there was an attack of unconsciousness for two hours. Patient otherwise has been well and follows his profession as merchant. Moore's patient had a weakness of right arm and slight contracture of fingers at time of publication. In Poulsen's case, vertigo was complained of after severe exertion. Nine years later patient was well. The patient operated on by Schede in 1885 is living, though was troubled with disturbance of speech for a long time. Schede's second patient was considerably changed during the first year. He was listless, distrustful, and irritable. During one night he had what seemed to have been an epileptic attack. This weakened condition of the brain slowly entirely disappeared and the man has been perfectly normal for years. Willis writes that his patient has remained mentally backward, and complains of headache, and is very excitable. Six months ago she suffered from sudden attacks of unconsciousness.

The chief disturbances in the general condition of cases of

otitic cerebral abscess which have been operated on are, as we have seen, sudden though infrequent attacks of dizziness which in most instances lead to unconsciousness. In two of the cases these attacks were regarded as epileptic. These are not, however, truly epileptic as are frequently observed after operations for traumatic brain-abscess, as the attacks have occurred only once or twice. According to Macewen, these attacks of unconsciousness are due to traction of the scars adherent to the meninges.

Among the last-mentioned ten cases only two suffered permanently after the operation in mind and in body. The others can surely be considered as cured. We have, therefore, 57 permanent cures in 141 operated cases (40.4 %). This result, of course, does not entitle us to exaggeratedly optimistic views; at the same time the very unfavorable attitude of some authors is refuted.

We now have but to consider, from the findings of our statistics, which cases offer the best outlook for recovery, and by which operative methods the best results can be obtained.

The age of the patient comes here into consideration only from the fact that any severe operative interference on very young children and very old people gives an unfavorable prognosis. Brain abscesses however occur but very rarely at these two periods of life, so that the percentage of the various ages in the cured cases is the same.

Eleven abscesses (42.3 %) of the 26 following acute otitis were cured. Forty-seven abscesses (43.1 %) of the 109 after chronic otitis were cured. Hence the prognosis of the operation of brain abscess is the same whether following acute or chronic ear-trouble.

On the other hand the acute or subacute abscesses give a much better prognosis for recovery than those running a chronic course:

Of 58 abscesses running an acute course 30 (51.7 %) were cured.

Of 16 abscesses running a subacute course 8 (50 %) were cured.

Of 11 abscesses running a chronic course 2 (18 %) were cured.

The symptoms which give the indications for the operation do not help us much as regards the prognosis. Cases with normal or subnormal temperature are in general more favorable than those which run a violent course.

In the presence of normal or subnormal temperature the abscess will probably not enlarge rapidly, as the virulence of the infection does not seem to be great and it can be assumed with considerable certainty that the abscess is uncomplicated. Uncomplicated abscesses, of course, offer the best prognosis. In our list of cured cases only four had intracranial complications; in 3, an extra-dural abscess, and in 1 a sinus phlebitis was present. In the uncomplicated cases 22 had fever; in 25 the temperature was normal or subnormal.

The presence of focal symptoms before operation is of no value in estimating the future course. Of all the operated patients 62.2 % had focal symptoms and 37.8 % had none. Of the cured patients 62.4 % had focal symptoms while 37.6 % had none.

The side on which the abscess is located and the patient's sex are of no prognostic value.

Size and site of abscess are, of course, very important for the prognosis. As Körner has shown the small abscesses are situated usually near the surface of the brain. These offer naturally a better prognosis than the larger and deeper-seated abscesses where the danger of perforation into the lateral ventricles is always present.

The contents and walls of the abscess play an unusually important role in the prognosis. First of all, it is important to know if the abscess contains pathogenic germs or not. The bacteriological and microscopic examination of the pus will solve this point. Color and odor of the pus give us no clue as to its virulency.

The cases where deep depressions and hollows exist in the walls of the abscess with no lining membrane can be regarded as unfavorable. These cases usually show their severity before the operation by threatening symptoms and

may exist under the picture of a meningitis. It is impossible in this case, even with the greatest care, to control the suppuration or prevent pus-retention.

The cases where after operation more and more of the surrounding brain tissue is destroyed, give a bad prognosis. The various methods of operation are represented in our statistics as follows :

Of the 81 operated through the squama 31 (38.3 %) were cured.

Of the 43 operated through the tegmen 18 (40.2 %) were cured.

Of 7 cases where the combined opening was made through the squama and the tegmen, 5 (70.1 %) were cured.

The last therefore gives the most favorable results.

An alphabetical table of these 142 cases of otitic brain abscess published as cured, with brief notes on the symptoms, method of operation, course, and remarks, together with references in the literature, can be found in the German original, *Zeitschrift für Ohrenheilkunde*, vol. xxiv., p. 96 and following, which, on application to the editor, will be sent for reference to any one of our readers.

ON THE INTESTINAL DISTURBANCES PRODUCED BY OTITIS MEDIA OF INFANTS.

BY DR. ARTHUR HARTMANN, BERLIN.

Translated by Dr. FELIX COHN, New York.

AFTER having established the fact¹ that the presence of a purulent otitis media in infants can, in almost all cases, be determined by otoscopic examination, I devoted myself to the task of investigating the relation between the otitis media, the nutrition, and the intestinal tract of the infant.

Tröltsch, who entered upon the discussion of the otitis of infants most thoroughly in the various editions of his textbook, while he disclaimed any clinical experience upon this subject, on theoretical grounds and upon the results of post-mortem examinations concluded that the pathological changes caused by middle-ear inflammation must necessarily, as in the adult, affect the entire system of the infant. He believed that, inasmuch as infants could not locate the seat of pain, and inasmuch as a satisfactory objective examination and a functional test of the hearing power were impossible, a diagnosis of otitis media could not be positively established.²

In my first publication, I proved that, in infants suffering from any disease, a complicating otitis may cause elevations of temperature. As an example I had cited the case of an infant suffering from broncho-pneumonia, in whom paracentesis on four different occasions immediately reduced the

¹ "Otitis Media of the Infant." *Deutsche medic. Wochenschr.*, No. 26, 1894.

² *Lehrbuch der Ohrenheilkunde*, 7th edition, S. 435.

temperature. From my investigations, pursued in the Institute of Infectious Diseases, together with Professor Kossel, I had drawn the following conclusions:

1st: The otitis media of infants may be accompanied by disturbances of nutrition, as evidenced by dyspepsia and emaciation.

2d: Upon evacuation of the contents of the middle ear through paracentesis, the disturbances in digestion disappear, and an increase of weight follows.

3d: Elevations of temperature occurring in the course of intestinal disturbances may be referred to a complication with otitis.

4th: In all intestinal affections of infants, accompanied by elevation of temperature and reduction in weight, an examination of the ears for the possible presence of otitis should not be neglected. Walb, Barth, Göppert, Ponfick, Steiner, and Heermann, shortly after the publication of my clinical observation, likewise published their experiences. My studies were made together with Dr. Finkelstein at the clinic of Dr. Heubner, who most cordially placed his material at our disposal.

Göppert arrives at the conclusion that the otitis which we find frequently in connection with intestinal diseases is caused by the latter affection, and considers the nausea and persistent vomiting of infants as an important aetiological factor in producing the otitis. In spite of the purulent character of this intestinal otitis Göppert believes it to be a far less dangerous form of aural inflammation than the otitis produced by coryza. Göppert was not able to find that an otitis alone, without intestinal disturbances, should produce diminution of weight, but on the contrary had observed remarkable increases of weight during the progress of the inflammation. He found fever due to the otitis in five cases; in three cases shortly after the rise of temperature, perforation of the tympanum; and in two cases he performed paracentesis. In the course of almost five months he had only observed one positive case. The faeces and urine were normal; bronchitis was absent. The drum bulged on one side only. In spite

of the otitis¹ there was marked increase in weight. His observation, however, is not convincing, for the reason that the weight was recorded only on the fourth day after paracentesis had been made. His observation only proves that the recovery after paracentesis caused a very rapid increase in weight.

Ponfick² observed in a number of his children, in the first and second years of infant life, intestinal disturbances which were accompanied by rise of temperature, and followed in a few days by sensitiveness of the auricular region, by crying, and motion of the hand to the affected ear. As soon as perforation occurred the fæces again became normal. In these cases the otitis was evidently the primary cause of the intestinal disturbances.

Barth, studied³ his cases in the outdoor department for infants and children up to three years of age.

Steiner⁴ reports his observations, which were gathered at the polyclinic in Breslau. He attempted to study the effect of the otitis media upon the general condition. The results of his observations appear to me based on unsatisfactory methods of research, and I shall therefore not report them in detail.

One of the reported cases is as follows:

Child four weeks old, was nursed at the breast until a few days before its appearance at the clinic, when the child received milk and tea in equal parts. Since its birth the child has suffered from convulsions, for one day diarrhœa and vomiting. *Status præsens*; well-nourished child; the weight 3460 gr.; heart and lungs, with the exception of a few ronchi, normal. During the time of observation, the weight of the child, in spite of regular food, decreased; numerous intestinal movements of watery character; weight decreases within two weeks 310 grammes. From now on gradual improvement, increase of weight after two weeks, weight of child 3510 gr.; further increase up to 3660 gr. when,

¹ "Untersuchungen über das Mittelohr des Säuglings im gesunden und krankhaften Zustande." *Jahrb. f. Kinderh.*, B. xlv.

² Ueber die allgemeinen pathologischen Beziehungen der Mittelohrerkrankungen im frühen Kindesalter.

³ *Zeitschrift f. Ohr.*, B. xxxii., S. 119.

⁴ "Otitis media der Säuglinge und ihre Folgen." *Prag. med. Wochenschr.*, No. 21, 1893.

with this established weight, a purulent otorrhœa became manifest.

A review of this case clearly shows that the diagnosis of otitis media was made only at the appearance of otorrhœa. At the first examination no otoscopic examination was made and no temperature taken. As the child evidently screamed and slept uneasily for some time before its inspection at the polyclinic, we must assume that the otitis really caused the intestinal disturbances and the diminution in weight.

Heermann¹ gave a further contribution to this subject. His deductions were based only on the results of post-mortem examinations, and really only corroborated the results of former investigations.

Ponfick's observations, that the intestinal disturbances are observed in the course of otitis, seem correct. When cholera-like diarrhœas are observed in infants, the otitis media may be found on examination. After paracentesis the intestinal disturbances gradually disappear. Careful weighings likewise show the influence of the otitis upon the general condition. As soon as the paracentesis is made, the decrease in weight is replaced by an increase. That we are not dealing with a secondary otitis, may be deduced from the fact that the intestinal disturbances occur simultaneously with the rise in temperature resulting from the presence of an exudate in the tympanic cavity.

Göppert rather refers the otitis to the act of vomiting and therefore considers it to be secondary. I cannot believe this ætiology, because we find the otitis as frequently accompanied by intestinal trouble as by respiratory affections.

Ponfick refers the intestinal affection to the resorption of toxic poisons from the exudate. This appears very likely, since all purulent affections in infant life lead to gastric disturbances. Rise of temperature in the course of intestinal diseases of infants, just as in broncho-pneumonic affections, is usually caused by a complicating otitis media.

In adults we observe quite often that chronic otorrhœa affects the general organism, and we may surely assume that

¹ "Ueber Otitis media im frühen Kindesalter." (Otitis concomitans). Verlag von Karl Markold, Halle, 1893.

the same relation between otitis and the general health occurs in infants. The relation of the atrophy to the otitis has not yet been satisfactorily solved, because the infants upon whom these observations are made are usually in a hopeless condition.

We may deduce the following from the recorded observations:

1. Acute febrile otitis causes a diminution in weight, or arrest of increase in weight.
2. Otitis accompanied by grave septic symptoms probably causes diarrhœa.
3. An acute febrile otitis occurring during intestinal diseases may act upon the general constitution, and by reducing the vitality, aggravate the intestinal affection, or retard recovery.
4. Whether there is a direct relation between atrophy and an otitis, must be reserved for further observations.

A report of the following histories will serve as an illustration of our deductions:

CASE 1.—*Simultaneous Occurrence of Acute Otitis, Intestinal Disturbances, Diminution in Weight and Rise of Temperature. After Paracentesis, Improvement in Digestion, Increase in Weight, Fall of Temperature.*

Else Zellmer, three months old, entered on the 19th of January, 1898, became ill on the 11th of January with symptoms of vomiting and diarrhœa. Child, well-nourished, pale, appears to be suffering, is restless, screams continuously. Respiration very superficial, accelerated, and interrupted occasionally by convulsive twitchings. Lungs normal; no vomiting. On the 20th of January, evening temperature 39.5° C. On the 21st, the otoscopic examination reveals a reddened membrane on the left side, somewhat bulged. After paracentesis, a serous exudate. On the next day, child is much quieter. In the evening, a normal movement. On the 25th of January, child dismissed as cured.

CASE 2.—Erich Schäfer, six months old, entered on the 7th February, 1898, suffering with general eczema. Besides an eczema, the child was suffering from coryza, and acquired a bronchitis. Before the latter affection, the stools were normal, temperature 37° ; on the following day, one normal, two altered

stools ; temperature 39.6° C. ; on the 9th, two altered movements ; temperature 39.7° ; on the 10th, two altered movements ; temperature 38.6° ; double paracentesis. Twelfth, again double paracentesis on account of poor drainage ; 14th, temperature 36.4° C. ; movement normal. On the second attack, temperature rose to 40.6° , the perforation and purulent discharge still present on one ear, while on the other a paracentesis became necessary. Child was somnolent ; did not react to pinching or on catheterization of the bladder ; beginning rigidity of muscles of neck ; anuria lasting over twelve hours. All these symptoms immediately disappeared after paracentesis. On the first attack, decrease in weight from 6220 to 6010 gr. ; on the second, decrease from 5910 to 5350 grammes.

CASE 3.—Simple Diarrhœa which Assumed a Cholera-like Character during the Attack of the Otitis and Improved Rapidly after Paracentesis.

Emily Strauss, four and a half months, admitted 10th of May, 1898 ; on admittance, formed movement ; on the 22d, stool has the consistency of gruel, and contains some mucus. Twenty-third : child uneasy, screams, temperature 38.9° . Twenty-fourth : movement watery, temperature 39.2° ; paracentesis on right side. Twenty-fifth : child calmer, temperature 36.1° . Twenty-sixth : movements improved, temperature normal. Decrease in weight from 2480 to 2320 ; from the 27th of May to the 3d of June, further increase 180 grammes.

CASE 4.—Pietruschka. Fourteen days old ; admitted with a purulent umbilicus on the 14th of May ; movement and temperature normal. Fifteenth : restless, screams, four diarrhœic movements, temperature 38° , tympanum bulged, paracentesis on left side. Sixteenth : child still restless, diarrhœa, temperature 38.1° , tympanum bulged on right side, paracentesis ; after latter paracentesis, movements improve, child becomes calmer, weight decreases from 3050 to 2960 and gradually rises to 3090 grammes.

CASE 5.—Margarethe Kuske, seven months old, admitted on the 19th of March suffering from streptococci enteritis, improves rapidly ; on the 20th movements fairly well-formed ; on the 29th, frequent coughing spells ; face cyanotic ; had screamed during night incessantly ; respiration not accelerated ; temperature 38.8° C. The otoscopic examination reveals reddened and bulging drum-membranes ; paracentesis ; exudate serous. Urine

somewhat turbid, contains albumen, hyaline, epithelial, and granular casts, a few leucocytes. On the 31st both ears are dry, perforations closed, tympani of pale color. Temperature remains normal. The weight, which had remained the same while the temperature was rising, in 10 days increased 500 grammes (from 3510 to 4010 grammes).

CASE 6.—Protracted Otitis Accompanied by Intestinal Disturbances and Slight Febrile Symptoms.

Gertrude Fordan, orphan, two and a half months old, admitted on the 30th of November, 1897, suffering with dyspepsia and coryza; on the 5th an examination reveals a double otitis; on the 14th double paracentesis, indicated on account of persistent slight temperature and no improvement in the condition of the child; after paracentesis temperature becomes normal, marked increase in weight and normal movements. On the 20th paracentesis again repeated on left ear. Later on renewed intestinal disturbances and exitus on the 14th of February.

CASE 7.—Chronic Otitis Accompanied by Gradual Decrease in Weight and Ending Fatally.

Else Zellmer had been treated two months previous on account of acute otitis (see Case 1); is again admitted on account of diarrhœa on the 15th of March. Stools diarrhœic and mucoid. From the 15th to the 19th, loss in weight amounted to 360 grammes. On the 21st, temperature 39.9° ; paracentesis on both sides. On the 22d, increase 120 grammes; temperature 38° ; 23d, movement the consistency of gruel; on the 24th, well-formed. On the 7th of April, weight 4410 grammes. After that, repeated closures of perforation requiring renewed paracentesis. On the 16th, rise of temperature accompanied by loss in weight; after paracentesis, fall of temperature, and maintenance of weight without loss or increase. As the otitis did not progress, an opening of both mastoids was considered; on the 8th of May temperature rises to 38.9° , rapid marasmus; death ensues on the 9th of May.

In spite of frequently repeated paracentesis there was no increase in weight. Probably the opening of the mastoid cells might have had a more favorable influence on the course of the disease.

CASE 8.—Fongyschowska, four months old, admitted on the 18th of February, 1898, suffering from bronchitis and furuncu-

losis. On the 11th of April, movements normal ; on the 12th, diarrhœic, temperature 39.2° ; on the 14th, incision of furuncles with corresponding improvement in character of movements ; on the 16th and 17th, paracentesis on right side, incision of furuncle on left ; from the 21st of April on, increase of weight and normal movements.

CASE 9.—Krajeck, thirty days old ; orphan, emaciated, cyanotic, crying, frightened expression. On the 30th of December, movements frequent, greenish, watery ; on the 4th of January, movements likewise unhealthy. Double paracentesis, pus present in both tympanic cavities. On the 7th of January, right-sided pneumonia, otorrhœa. On the 15th, furuncles in both ears. On the 5th of February, right ear cured ; on the 7th, left ear cured. During the further course of the disease, the intestinal disturbances still remain present, besides formation of abscesses in lymphatic glands. On the 27th of February, exitus letalis.

THE DIAGNOSIS OF INFANTILE OTITIS.

The difficulty in the diagnosis is caused not so much by the narrowness of the canal or the oblique position of the tympanum as by the presence of wax and scales in the external canal. According to my records, an otoscopic examination failed in about half the cases, the failure being due either to the presence of small scales, or, frequently, to the formation of a fine membrane covering the tympanum and composed of dried vermix caseosa, desquamated epithelium, and other foreign substances. A cleansing of the canal may be most easily accomplished by removing the detritus or membrane if possible without syringing, and in one piece by carefully loosening the membrane from its surroundings with a probe and then extracting it with a knee-forceps. I generally employ a thin copper probe. For inspection, a very narrow ear speculum must at times be employed, and the forceps should be adapted especially for this purpose. A proper artificial light or sunlight with a plane reflector are most necessary adjuncts. Occasionally one might be able to employ a little wider ear speculum. Göppert first advised instillations of oil, but later on resorted to my method.

One readily determines the location of the tympanum by

means of the handle or short process of the malleus. The short process appears frequently as a white prominent point easily distinguished from the reddened and infiltrated tympanum. Frequently the posterior portion of the drum membrane bulges. In the latter case the handle of the malleus is almost hidden from view, the short process invisible. Under such condition, the diagnosis may become quite difficult, because the posterior wall and the prominent bulging posterior portion of the tympanum also merge in one another, and one may be inclined to consider the bulging tympanum as part of the external wall of the auditory canal. The use of the probe in such a case is of the utmost importance.

In dubious cases an exploratory puncture may be permissible. Frequently the examination appeared to reveal a normal drum membrane. The paracentesis or in some cases the post-mortem examination proved the presence of an exudate in the tympanic cavity. The reverse likewise occurs: an apparently infiltrated membrane without an exudate.

Göppert is inclined to refer the difficulty of the otoscopic examination in infants to the obtuse angle formed by the tympanum and the posterior wall, thereby interfering with the transmission of light and diminishing the transparency of the inspected membrane.

There is, however, another cause for the difficulty of the inspection of the tympanum in infants. The external surface of the funnel-shaped tympanum is slightly convex, with the convexity in the direction of the auditory canal. The portion adjoining the short process likewise bulges slightly in the same direction. This prominence is in reality very slight, but on account of the variation from the direct line of view, and the natural curvature of the tympanum this prominence appears magnified and is apt, therefore, to be taken as a bulging of the posterior superior quadrant. This apparent outward prominence, which even in the normal tympanum frequently holds the handle of the malleus from our view, appears in perspective, therefore, to be almost at right angles to the posterior inferior quadrant,

and on a plane corresponding to a line drawn from the external opening of the auditory canal to the upper border of the eyebrow.

There is no direct relation between the degree of injection and the character of the exudate, an almost purulent exudate being frequently accompanied by an almost normally colored tympanum. Much more importance should be attached to the opacity of the tympanum, which sometimes, as only one symptom, may enable one to diagnose an otitis media. Occasionally we find an accumulation of pus in the tympanic cavity, when the tympanum appears almost white and shiny, a condition caused by an accompanying high degree of anæmia. In some cases a dark injection and color of the drum membrane will lead us to the diagnosis of exudate in the tympanic cavity. Göppert, as well as myself, has been able to inspect the drum membrane even in still-born infants.

THE TREATMENT OF INFANTILE OTITIS MEDIA.

V. Tröltzsch, who in his text-book discussed most thoroughly the results of the post-mortem examination in infants suffering from otitis media, made no attempt to elucidate the methods of examination in the living, and was, therefore, naturally unable to recommend a method of treatment. He only theoretically refers to the use of the Politzer bag, inasmuch as inflation, by opening up the Eustachian tube, would give vent to the exudate pent up in the tympanic cavity and in the upper portion of the tube.

Shortly after my publication, Walb studied this subject, the treatment of otitis in infants, and reported his results at the fourth meeting of the German Otological Society (1895, *Verhandlungen*, S. 144). He desired a method that could be used in every case, and recommended inflation in order to assist drainage and completely expel the purulent secretion from the tympanic cavity. Inflation is very readily accomplished, since the tube in infants and children may be opened by the slightest air-pressure. At the meeting a number of objections to this method of treatment were

brought forward, and it was decided to await further observation before recommending the proposed method.

The treatment of otitis in infants may be based upon the principles underlying the treatment of otitis in adults. In the cases that are accompanied by restlessness, pain, screaming, fever, and emaciation, paracentesis should be made without delay. After thorough cleansing and careful disinfection, the inferior portion of the membrane should be incised. When the exudate, welling out of the opening, is carefully dipped up with a pledget of cotton saturated with peroxide of hydrogen, I usually inflate, in order to expel the exudate from the tympanic cavity. This procedure is repeated daily, and only on rare occasions do we find the tube impervious for the current of air. After inflation the auditory canal is closed with pieces of gauze. The gauze is introduced as deeply as possible, and it is immaterial whether sterilized iodoform or nosophen gauze is used. In case the opening in the tympanum closes before the cavity is entirely free from exudate, the paracentesis should be repeated. The same treatment may be followed even in cases where a spontaneous perforation has occurred. If the perforation is very large, boracic acid in the form of powder may be insufflated after the ear has been thoroughly cleansed.

If the main symptom appears to be pain, the attempt might be made to cut short the inflammation by using a solution of carbolic acid in glycerine. I usually employ a solution of one part of carbolic acid to ten of glycerine. The warm solution is poured into the auditory canal and pressed towards the tympanum by repeatedly compressing the tragus with the finger. The solution is allowed to remain a few minutes, and then will be removed with absorbent cotton. I have frequently seen children completely quieted by the use of these warm instillations.

Gomperz recommends most highly tampons saturated with acetate of aluminium solution (equal parts of liquor Burowi and distilled water) introduced warm or tepid and changed every two hours. In case there are no urgent symptoms and the presence of the otitis has been diagnosed only by the otoscopic examination, an expectative treatment

is advisable. Should, however, a resolution not take place spontaneously, paracentesis should not be delayed. Frequently, even in atrophic infants, although no bulging of the membrane may be apparent, an exudate may be present in the tympanic cavity.

In case the secretion remains copious and purulent, particular care must be taken to maintain a sufficiently wide opening in the tympanum in order to assist drainage. The mastoid process is usually involved, but the exudate in the antrum drains through the tympanic cavity, and in spite of this involvement recovery may take place without resource to opening of mastoid. Insufflations of boracic acid aid the recovery, and there is no danger of a retention, because the powder is generally dissolved by the exudate. If the secretion does not diminish, in spite of the inaugurated treatment, the mastoid should be opened. Should there be œdema or an abscess in the region of the mastoid, an operation is absolutely indicated. One frequently finds granulations and detached particles of bone or even large sequestra sometimes containing the entire posterior osseous portion of the auditory canal.

The general condition of the little patient must not be neglected. A more rapid recovery from the otitis may be expected if the physician is enabled to maintain a general good condition of the infant, a not easy task among the poor or in the hospitals, where artificial feeding must so frequently be resorted to.

The condition of the nose is also of the greatest importance. Fluctuations in temperature must be carefully avoided; nasal respiration should be maintained if possible by carefully removing the nasal secretion and keeping the nares patent. I have frequently observed that nasal catarrhs are cured by closing the mouth of the screaming infant, and forcing it to breathe through the nose. Nasal respiration may be aided in obstinate cases by forcing air through the nose with a small rubber bag, and employing at intervals a one-per-cent. cocaine spray. Not a very great deal of fluid is required to increase the respiratory space. If the secretion is very purulent, a one- to two-per-cent. saline solution or a weak solution of

peroxide of hydrogen may be forced through one nostril with a small syringe, while the head of the infant is held downwards. Sometimes we employ these solutions in the form of sprays. Very favorable results have also been obtained by the use of 1 : 1000 nitrate of silver sprays.

I have rarely found adenoid vegetations present in infants, nor have I been able to find them in post-mortem examination. The presence of adenoid vegetation is probably a rare complication. Gomperz reports having found post-nasal growths, and removed them, in extremely young infants.

SARCOMA OF THE MIDDLE EAR.

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SARCOMATOUS growths of the middle-ear cavity are very infrequently met with. Bezold¹ of Munich, during the years 1893 to 1896, reports having treated 5327 ear patients and encountered sarcoma of the middle ear but one time, while Gruber² in his Vienna clinic, during 1890 and 1891, reports having treated 10,157 new ear cases without recording a single patient with middle-ear sarcoma.

The following remarkable case came under my observation August 2, 1898. A little girl three and a half years old, according to the mother, who is a widow, first complained of earache in January, 1898. The pain lasted but a night or two and ceased without special treatment, nor was it accompanied or followed by an otorrhœa. The child has never had measles or scarlet-fever nor has it ever been much sick. The father died of consumption and the mother is herself a pale, delicate, and highly nervous little woman. In March following, the child again had earache a night or two, followed in two weeks by a discharge from the right ear. The mother of her own accord syringed the ear daily for several days and thought she had cured the trouble. In April the mother detected in the right ear canal a small reddish growth which slowly became larger and caused the ear to run. She consulted Dr. H. T. Dixon on June 20, 1898, who furnished me the following record: The discharge from the ear was somewhat offensive,

¹ ARCHIVES OF OTOTOLOGY, vol. xxvii., No. 4.

² *Monatschrift für Ohrenheilkunde sowie für Kehlkopf-, Nasen- und Rachenkrankheiten*, May and October, 1892.

and filling the right auditory canal was a reddish fleshy growth which he took to be a polypus and removed with the cold wire snare. The external ear and the region about it was free from soreness or swelling and he ordered that the ear be daily syringed with a warm aqueous solution of boric acid. On June 24th he removed more of the fleshy growth by the snare with only a slight amount of bleeding. The syringing with the boric acid solution was daily repeated and the child retained under observation. In about ten days the growth returned, and he now administered chloroform in his office and attempted under anæsthesia a more thorough removal with the snare than had been possible previously without narcosis. The operation was repeated in this way some four or five times at intervals of about fifteen days, but at no time was the accompanying bleeding severe enough to require special treatment. The child did not complain much of ear pain nor did it receive treatment for earache and at no time was it enough indisposed to keep it from following its usual everyday life. A few days after his last using the snare, the doctor observed an enlargement back of the auricle and over the mastoid which rapidly increased in size but did not occasion fever or other symptoms of ill health. He now requested the mother to consult an ear specialist and directed them to call at my office August 2d which they did, **when the following was entered into my record book** : The child is thin and anæmic and inclined to be irritable. Protruding from the external auditory canal is a reddish and somewhat irregular fleshy growth, not painful upon contact with the ear probe and not disposed to bleed much after a gentle examination. The ear discharge was of a thin sanguino-purulent character, not profuse, and not very offensive. Back of the auricle and over the mastoid region was a smooth swelling of a soft doughy consistence and of the size of a small hen's egg. The skin over the swelling was not involved in the tumor neither was it inflamed or painful upon pressure. The mother was told that the tumor had its origin in the middle ear and that the only possible source of relief was through an operation. Accordingly, August 5th, with Dr. Dixon administering the anæsthetic, an incision was made about two inches long back of and parallel with the insertion of the auricle through the skin and into the tumor. The skin flaps were dissected free from the growth and this finally incised down to the mastoid bone. Neither pus nor cheesy matter was found but instead a soft

and reddish-gray fleshy mass that upon compression yielded a pale grayish-white juice, and which was easily and quickly removed by the sharp curette. The bleeding was not severe and required no special attention. As anticipated, the outer table of the mastoid was eroded in several places, through the ragged openings in which the growth was followed by the sharp curette and as much of it as possible removed from the mastoid cavity and antrum. The polypoid growth in the external auditory canal was snared off and preserved for microscopical examination. The mastoid opening was packed with iodoform gauze over which an external dressing of absorbent cotton and a bandage were applied. The two following weeks I was absent from home during which time Dr. Dixon attended the little patient. He reported removing the primary dressing the third day and thereafter renewing the dressing every second day. By the end of one week there was a noticeable return of the tumor not only through the opening in the mastoid but in the auditory canal. In a few days more he detected facial palsy, then aphonia, and difficulty in swallowing. I again saw the patient August 25th, and found protruding throughout the line of incision an angry-looking fleshy mass with a tendency to break down and ulcerate in the centre. The lymphatic glands around the external ear were, in common with the parotid gland, very much enlarged. Laudanum was daily administered to relieve pain. The facial palsy remained complete, but the voice was partially regained and the swallowing improved. October 14th, or about nine months since the first attack of earache, the child died in convulsive movements, but with retained consciousness up to within fifteen minutes of the end.

A portion of the tumor removed from the external ear canal at the time of operation was submitted to Prof. Jos H. Linsley of the University of Vermont who made the following report: "The mass examined is made up largely of embryonic tissue, the cellular elements predominating, and are principally small round cells with a fair number of spindle cells. The growth is fairly muscular, the blood-vessel walls being very thin and in close relation with the tumor cells. A tendency to grouping of the round cells is seen in places. **The growth is a small round- and spindle-cell sarcoma.**" All authors recognize the difficulty in de-

termining the point of origin of sarcomatous growths found within the middle ear. In the one instance it may be the periosteal lining of the tympanic cavity, and again it may be the lining of the mastoid cells. Schwartze is of the opinion that the dural covering of the petrous portion of the temporal bone is the starting-point as a rule, and that later the tympanum is affected. We find the disease occurring in persons who for years have had a suppurative middle-ear disease, and again in those who have had only an acute otitis media. The greatest number of cases however are reported in persons who previously have had no middle-ear disease at all. Age bears a much more important relation to the development of sarcoma than the existence or not of a previous middle-ear inflammation. By far the greatest number of cases have occurred in childhood, and the duration of life averages less than one year. As a rule, the beginning of the disease is unattended by pronounced symptoms, but as soon as the drum is perforated and a polypoid formation is found in the external canal, otorrhœa arises either of a serous or bloody character. Hartmann¹ however maintains the reverse from this and says pain during the development of the growth, as a rule, is severe, and reports a case of round-cell sarcoma in a three-and-a-half-year old child which otherwise pursued a course very similar to my own. The diagnosis is not always easy, especially when the new formation is extremely soft and semi-fluctuating to palpation, and a number of times such cases of sarcoma have been mistaken for retro-auricular abscess.² With a complete history of the case and after having had it under observation for a time, and in addition made a microscopical examination of such part as could be easily removed by the snare, there is little danger of erring in the diagnosis.

¹ Hartmann, *Krankheiten des Ohres*, p. 249.

² Bezold in Schwartze's *Ohrenheilkunde*, vol. ii., p. 335.

A CONTRIBUTION TO THE TECHNIC OF PERFORATING THE MAXILLARY ANTRUM.

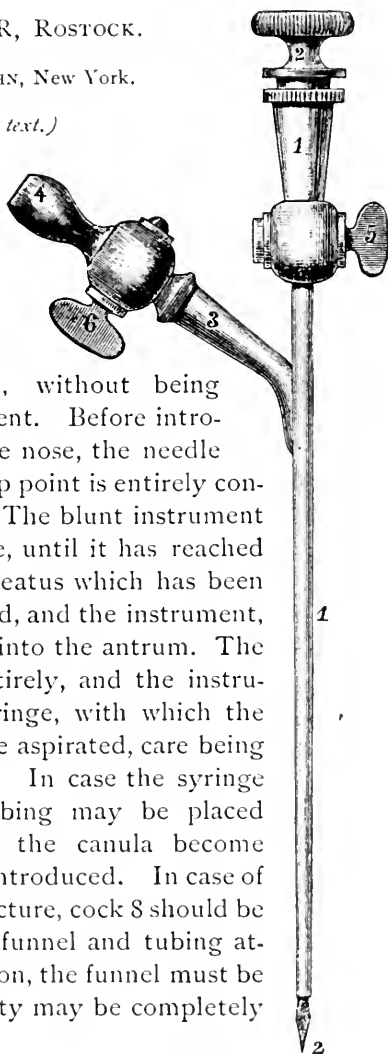
BY PROF. O. KOERNER, ROSTOCK.

Translated by Dr. FELIX COHN, New York.

(With illustration in text.)

THIS instrument (see illustration) enables the operator to perforate into the antrum for diagnostic purposes, and to follow up, if desirable, the exploratory puncture with an irrigation, without being obliged to remove the instrument. Before introducing the instrument into the nose, the needle (2) is drawn back until the sharp point is entirely concealed within the canula (1). The blunt instrument is then introduced like a probe, until it has reached the location on the inferior meatus which has been selected. The point is exposed, and the instrument, being grasped firmly, is forced into the antrum. The needle is now withdrawn entirely, and the instrument is connected with a syringe, with which the contents of the antrum may be aspirated, care being taken to close the cock at 6. In case the syringe is too loose, some rubber tubing may be placed around the canula. Should the canula become blocked, the needle may be reintroduced. In case of an irrigation following the puncture, cock 8 should be closed, cock 6 opened, and a funnel and tubing attached to 4. After the irrigation, the funnel must be lowered, in order that the cavity may be completely drained of its fluid contents.

The instrument may be obtained at "Pfauf," Berlin, Dorotheenstrasse 67.



THE ACTION OF THE SEA-CLIMATE AND OF SURF-BATHING ON AURAL AFFECTIONS AND HYPERPLASIA OF THE PHARYNGEAL TONSIL.

BY PROF. O. KÖRNER, ROSTOCK.

Translated by Dr. FELIX COHN, New York.

SEVERAL of our professional brethren have expressed decided opinions on the influence of the sea-climate upon aural affections and upon hyperplasia of the pharyngeal tonsil. These opinions, however, have been more dependent on subjective impressions than upon systematic investigations.

The following studies were undertaken in the summer and fall of 1898, in order, if possible, to obtain actual data in regard to this important medical question. The material, however, which has been at my disposal has been far too small to draw any broad conclusions, and I am led to publish the interesting results only in the hope that some of my colleagues may be led to undertake similar investigations.

The Friedrich Franz Hospital at Gross-Müritz, a place situated on the Baltic, admits debilitated and sick children for six weeks, in order to give them the benefit of forest-air and sea-bathing. I have examined 144 children, both at the time of their admission and departure. The pharyngeal tonsil was not removed in any of the cases, and the ears affected with otorrhœa only occasionally syringed.

The children, who were of both sexes, vary from four to fifteen years in age. The diagnosis in the respective cases on admission was as follows:

Cephalæa.....	2	chil'n, of wh.	0	were affected with adenoid veget'ns
Chorea.....	3	"	2	" " " " " "
Neurasthenia.....	3	"	0	" " " " " "
Retinitis.....	1	"	0	" " " " " "
Rachitis.....	1	"	0	" " " " " "
Osteomyelitis.....	1	"	0	" " " " " "
Bone tuberculosis.....	2	"	0	" " " " " "
Kyphoscoliosis.....	3	"	1	" " " " " "
Scrophulosis.....	47	"	20	" " " " " "
Pulm'nary tuberculosis	12	"	2	" " " " " "
Bronchitis.....	9	"	1	" " " " " "
Vitium cordis; palpi- tation of heart.....	4	"	1	" " " " " "
Anæmia; Chlorosis..	33	"	8	" " " " " "
Gen'l debility, atrophy	21	"	10	" " " " " "
Reconvalescent.....	1	"	0	" " " " " "
Tonsillar hypertrophy.	1	"	1	" " " " " "
	144		46	

Of the 46 cases with hyperplasia of the pharyngeal tonsil, the tonsil was found very much enlarged in 13, large in 15, and moderately enlarged in 18 cases.

1. 21 children had their home on the sea-coast (from 0-15 kilometres away from the sea line).

2. 34 children resided more inland, in a transition climate (from 15-100 kilometres away from the sea).

3. 89 lived inland, (more than 100 kilometres away from the coast).

Adenoid vegetations were found present in 11 out of 21 cases in the children from the coast; in 9 out of 34 cases in the children from the transition climate; in 25 out of 89 cases in the children living inland.

During their stay at the hospital the following increase in weight was noted:

13	children with very large hyperplasia	gained	1778	grams
15	" " a large	"	2142	"
18	" " a moderate	"	1741	"
98	" without any	"	2183	"

Marked retraction of the tympanum was recorded in 24 cases. These retractions were not affected for better or worse; in none of the cases, however, did an acute middle-ear inflammation occur.

In two cases the retraction of the drum membrane had slightly increased.

Cicatrices of the tympanum were present in seven cases ; in one of the cases a painless otorrhœa occurred, accompanied by a spontaneous perforation through the cicatrix.

Dry perforations were noted in 3 cases ; not one of them developed an otorrhœa. Only two of the children were examined before their departure, but in these no otorrhœa had occurred, in spite of 24 sea-baths in the one case, and 33 in the other.

Tympanic suppuration was present at the time of admission in 6 cases. On their departure the otorrhœa persisted in only 2 cases. In 2 cases the otorrhœa had ceased : in the one case after 17 warm baths, and in the other after 23 cold sea-baths. Closure of perforation in 2 cases !

Minor opacities of the drum membrane were not recorded. In one case a marked opacity of the stratum corneum had been cleared after 27 baths.

Furuncles did not occur in any of the 139 children who were bathing.

I take great pleasure in expressing my sincerest thanks to the director of the hospital, Professor Martins, and to the resident physician, Dr. Wagner, for their kind assistance.

TWO CASES OF OTITIC SINUS THROMBOSIS, THE ONE FATAL, THE OTHER ENDING IN RECOVERY.

BY HERMAN KNAPP, M.D., NEW YORK.

(With two temperature charts.)

CASE I.—Chronic Purulent Otitis in a Child. Sinus thrombosis. Pyæmic Pneumonia. Operation. Autopsy.

January 8, 1898, Josephine Kraften, æt. ten, of Astoria, L. I., was brought to the New York Ophthalmic and Aural Institute, with the following history. Family healthy, but the child always delicate. She had ear trouble since her first year, discharge off and on for a year or two. Then the otorrhœa ceased until September, 1895, when she had earache on the left side, followed by otorrhœa and abatement of pain. The otorrhœa continued—stopping sometimes for a day—until September 24, 1895, when it ceased completely. On the following morning the child cried from pain in the left ear and the forehead, which in the afternoon had extended to the occiput. These symptoms continued ten days. Then,

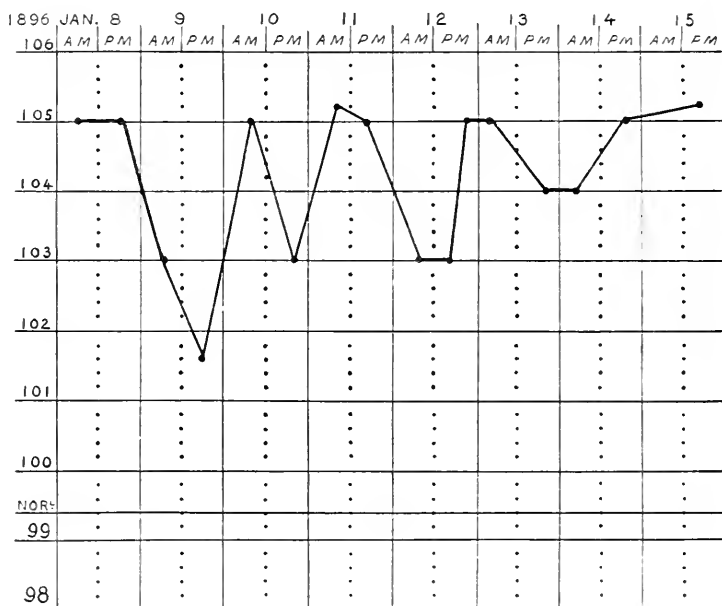
January 4, 1896, she complained of dizziness, vomited twice, whereupon she had a *shaking chill followed by fever*. The four following days she was excitable and had hyperæsthesia of the skin; touching of the skin made the child cry out. On the 7th, the child had another chill. She complained principally of pain in the neck and left shoulder. She has lost flesh and has suffered from constipation during the last two weeks.

Condition on admission.—Emaciated small child, is in an apparent stupor (received morphia yesterday and to-day), but answers questions rationally. Eyes partially open, pupils narrow, but responsive to light. Cries from pain when touched. Mastoid

on both sides normal, the left slightly larger than the right, but free from redness. The region below the left mastoid in front of the sterno-mastoid muscle is especially painful to the touch. Discharge of foul-smelling pus from the left ear. Temp. 105° F., (see chart) pulse 120, respiration 40 to 45. When the pupils were dilated a marked choked disc was readily seen in both eyes. No hemianopsia, no photophobia. Auscultation and percussion negative.

JOSIE KRAFTEN, aet. 10.

Chron. Otitis. Sinus Thrombosis. Pyæmic Pneumonia.



The history and symptoms clearly indicating otogenous pyæmia from thrombosis of the left lateral sinus with pulmonary affection, operative interference was decided on and consented to by the mother the next day.

January 9, 1898, operation.—After the side of the head adjacent to the left ear had been extensively shaved and the surroundings of the ear sterilized with soap and ether, and the child etherized, a large curved incision above and behind, close to the auricle, was made down to the bone, followed by another from the vicinity of the upper end of the first about 2.5 cm backward.

The entire surface of the mastoid was bared, the posterior and upper border of the ear canal exposed, the soft wall of the meatus detached from the bony wall and held applied to the anterior wall with a tenaculum. The mastoid near the canal was chiselled away, together with the posterior bony wall, until the antrum was reached. The antrum was very deep and surrounded by dense ivory bone. A bent probe was introduced into the aditus and upon it the overlying bone removed by careful chiselling until the attic was reached. The latter was cleansed with a sharp spoon. The ossicles were absent.

The wound was then extended by chiselling the bone in a backward direction. At a depth of 3 to 4 mm the lateral sinus was reached. It was deep-black and plainly pulsating. The opening was enlarged with chisel and bone forceps until it had a diameter of 2 cm each way. In the upper part of the opening thickened dura mater was visible. With a hypodermic syringe a small quantity of the contents of the sinus was withdrawn. It was dark blood without odor.

The ridge of bone between the sinus and antrum was chiselled away, the wound cavity tamponed with sterilized gauze, and the child put to bed. In the evening, when she came out of the ether, she was perfectly rational and complained only of pain in the wound. 10 P.M., temp. 101.5°.

January 10th.—Mother states that the child was delirious during the night, but slept well after taking a morphia powder. The child answers questions, but is very weak. Temp. 105°, pulse 140, resp. 45. In the afternoon she rallied, was brighter, and took a cup of milk. Evening temp. 105.5°, pulse 130, resp. 40. The child coughed now and then.

January 11th.—Slightly weaker, had a fair night. Temp. 105.2°, pulse 145, resp. 45. Having had no passage for three days, received an enema which brought several hard lumps of fæces. Optic neuritis marked. No pain, slight cough. Wound dressed; no secretion or swelling, but sinus discolored.

January 12th.—Patient was so weak and drowsy that she was not expected to live through the day. Temp. 105°. Cough worse. No swelling or tenderness below ear or along sterno-mastoid muscle.

January 13th.—Patient was so much better that the dressing was changed again. *A large portion of necrosed sinus and contents with gangrenous odor were removed.* Fresh blood came from

above, not from below. Cough. Pain in back. Child still answered questions when aroused, but was very weak and lay with her eyes closed. Temperature, which the evening before had fallen to 103° , rose again to 105° in the evening. Pain in back increased. Optic discs grayish-white, swollen, veins greatly engorged, some hemorrhages at periphery of discs.

January 14th.—Wound dressed. No material change in condition of child. Cough increasing and more distressing. Temperature 105° in the morning, 104° at noon, 105° in the evening. Respiration rapid and laborious.

January 15th.—Child very weak. Temperature 105.3° , pulse 145, respiration 45. Coughed a great deal. Became steadily weaker during the day, and died at 7 P.M., never having lost consciousness until shortly before death.

Autopsy.—Only the head and neck were allowed to be examined. On removing the rachitic skullcap, normal dura was exposed, under which dilated veins were seen. On the under surface of the cerebellum there was a small amount of serous exudation with some coagulated masses. The sinuses were filled with dark blood. The sigmoid sinus was destroyed. The jugular bulb was filled with a dirty whitish-yellow clot, which, toward the beginning of the vein, gradually contracted, adhering to the wall. Immediately below the clot, the jugular vein was empty, with smooth walls, and normal calibre, but thence it rapidly contracted to a narrow tube with an even diameter of 2 or 3 mm down the whole length of the neck. The walls of the tube had the thickness of an arterial vessel of the same calibre, its inner surface was smooth, but the lumen was interrupted by round, grayish pellets at intervals of 2 to 2.5 cm, adherent to the walls of the vein. They had the appearance of coagulated fibrine.

Remarks.—A delicate child, had intermittent otorrhœa almost all her life, was brought to the hospital in a very low condition from an otogenous pyæmic pneumonia. A radical operation was done, the sigmoid sinus exposed, and on puncturing dark blood without odor was withdrawn. Child better the next day, worse the day after, when at the dressing a large portion of necrosed sinus and gangrenous, offensive contents were removed. Death two days later, on the 7th day after admission to the hospital, on the twenty-second after the last (fatal) relapse of otitis. The autopsy of the

head and neck revealed infective thrombosis of the lateral sinus, extending into the bulb of the jugular vein, which it occluded at its lower end by a dense, not disintegrated clot.

A remarkable feature of the case was *the shrinkage and the complete emptiness of the internal jugular vein*. The vein resembled a thin, empty artery of 2 or 3 mm in thickness. When slit open, pellets of coagulated fibrine were found in its whole length at an interval of about 2 cm. The inner wall of the vessel was smooth and free from odor. I suppose that the occluding clot had formed when a sufficient quantity of the infective material had penetrated from the sinus and bulb into the circulation to cause the lethal issue by pyæmic pneumonia. Two days before her death, when a portion of the lateral sinus was removed, fresh blood came from above not from below. At no time, as long as the child was at the hospital, was there any hardness felt along the anterior edge of the sterno-mastoid muscle. Had I attempted to ligate the internal jugular it would have been a failure, for in the autopsy I had the greatest trouble to find the vein, and could only identify it when I followed the thin, apparently arterial, cord up into the bulb, where it suddenly broadened and revealed its character.

CASE 2.—Otitic sinus thrombosis. Multiple metastatic arthritis. Several ear and sinus operations. Recovery.

On July 1, 1898, Dr. F. P. Lewis of Buffalo brought to my office Mr. Sh. Colman, æt. eighteen, of Dunkirk, N. Y., and kindly gave me the following notes on the patient's previous **History**: "In January, 1894, S. C. came under my care, stating that he had occasionally had severe attacks of earache, as far back as he can remember. He had for some years been under the care of an otologist, who several times removed growths from the ear. On examination I found excessive granulations occluding the mouth of a fistula extending upward and backward, apparently into the antrum. The granulations being rooted out, the channel was traced back into an apparently closed cavity. The boy was anæsthetized and the necrosed tissue removed through the external-ear canal by scraping the cavity with a sharp spoon. This gave relief for nearly a year, when an opening had formed at the site of the former fistula. The cavity was again

scraped, but this time the discharge was controlled for only about six weeks. Very great prostration followed this apparently simple operation, temperature for several days being subnormal, about 97° F. Previous to the last recurrence of the discharge he had for several days been bathing in Lake Erie, getting the cold water into his ears. After this time he went away to school for a year, having the ear treated with injections of nitrate of silver.

"In April, 1898, he returned with a much worse condition of the ear than ever before. The discharge was profuse and offensive, and there were exuberant granulations at the opening of the fistula. A more thorough operation was, therefore, immediately determined upon and performed within a few days. The mastoid was opened freely and a necrotic cavity discovered, which was chiselled clean. The posterior wall of the ear canal was taken away, and the lining dermal tube slit and spread out over the newly made cavity. The operation was done with strict antiseptic precautions, and the dressing not removed for five days. At the end of that time the dressing was found dry and free from odor. Very slight rise of temperature passed quickly. The restorative process went on uninterruptedly for two months, at which time the wound had almost closed, only a fistulous sinus remaining, but soon the edges of the wound assumed a bluish, unhealthy look. The glands of the neck became swollen and hard, and the patient felt generally ill. The wound was again opened and found to lead into a carious channel extending deep into the substance of the bone. It then became evident that a very extensive operation would be required, possibly imperilling the lad's life, and further counsel was sought and obtained."

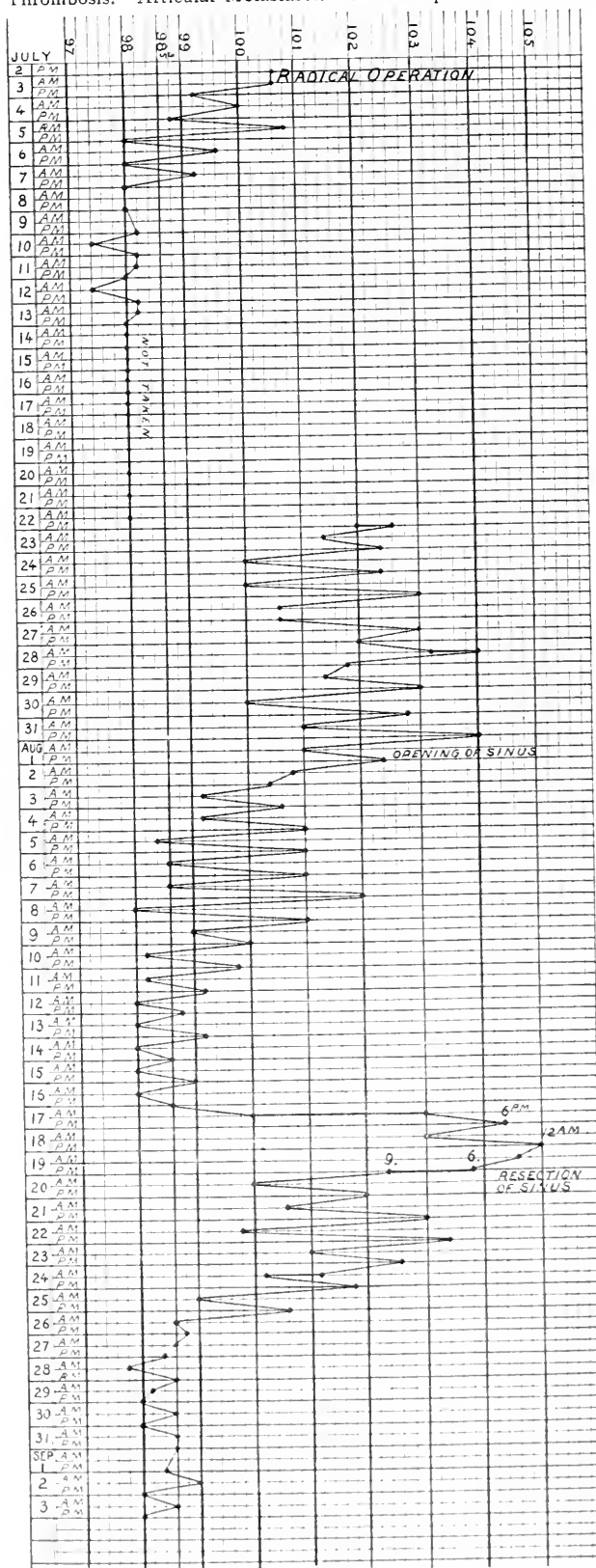
A detailed description of the **condition on admission** to the hospital **and the operation** is contained in a paper published in the ARCHIVES OF OTOLGY, vol. xxvii., p. 329, to serve to illustrate methods of the functional examination of the ear. I shall here mention the condition only briefly. A large granulating wound, reaching high up, was found in the mastoid. Membr. tymp. gone. Granulations and bare bone felt at the bottom of the middle ear. The probe passed under the lateral wall of the attic and considerably backward. Temperature, 100°; headache, dizziness. The left ear healthy. The right was totally deaf, as proven by the tests of Dennert, Weber, and the present writer (ARCH. OTOL., *L. c.*, p. 327). There was no facial paralysis, no

abnormality of sight or of the interior of the eyes. The diagnosis was : *extensive chronic caries of the mastoid, attic, and tympanum, extending into the labyrinth.* A **radical operation** was performed July 2d, removing all carious bone, including both larger ossicles, the external wall of the attic, and the posterior wall of the mastoid, exposing the sigmoid sinus. The dura at the bottom of the middle cranial fossa, laid bare by a previous operation, was lined with a grayish-white coat, imposing for cholesteatoma. The wound cavity in the mastoid was covered with the flaps of the split soft wall of the ear canal. Dressing with aseptic gauze.

Course.—The patient did well for three weeks. The temperature, 100.6° at the day of the operation, sank to 99° on the next day, to 98° at the third, then, with a slight feeling of chilliness rose abruptly to 100.8° on the fourth, sank to 98° on the fifth, varied slightly above and below 98° until the twentieth day, when, with more pronounced chilliness, it suddenly rose to 102.6° , then showed steep elevations and depressions between 100° and 103° until the twenty-sixth day, when, with another attack of chilliness, it reached 104° , falling the next morning to 100° ; the twenty-eighth the difference was less, but on the twenty-ninth day after the operation it rose to 104° again and fell to 101° . This characteristic temperature of pyæmia (see the chart) was accompanied by a pulse varying from 66 and 124, by regular and easy breathing, without cough, but by pains in the limbs, pains and stiffness and swelling in various joints of both sides, apathy, total loss of appetite, nausea, at times vomiting and dizziness, dullness. The percussion tone of the spleen was slightly enlarged, the skin warm and moist, no distinct chills or sweats, fundi oculorum normal; one day, July 26th, urine 1% of albumen, later traces only; wound looked well; slight tenderness over the upper portion of the jugular vein; head all the time clear and free from pain. In the latter part of July, the temperature was most abnormal, and the joints most swollen, stiff, and painful; the appetite was somewhat restored, and the bowels were relieved daily.

The symptoms denoting a clear case of pyæmia with articular metastases, but freedom of lungs and meninges, a **new operation** was decided on, consented to by the patient and his brother, and performed on August 1st, under the presence and assistance of Dr. Lewis. Previous wound enlarged to tip of mastoid and horizontally backward in the direction of the transverse sinus 3.5 cm.

Sinus Thrombosis. Articular Metastases. Several Operations. Recovery.



All the parts of the tip were chiselled away, with the exception of the medial table, which appeared healthy, whereas the internal parts were diploic, congested, and easily broken down, but not necrosed. The lateral sinus was laid bare to the extent of 4 cm in the vertical and 2.5 in the horizontal direction, toward the torcular. It looked blue and felt soft. In attempting to enlarge the wound in a backward direction with a rongeur, the sinus was accidentally injured, letting dark, fluid, inodorous blood escape. The bleeding was easily stopped by tamponing with aseptic gauze. A part of the sinus, adherent to the scab from the previous operation, appeared thickened, and was split with a Graefe knife. Dark fluid blood escaped. *The wall proved thickened as from adherent fibrous tissue*, but nothing of the thickened tissue could be scraped off with a sharp spoon. On compressing the upper part of the sigmoid sinus, a moderate flow of blood came from below, whereas on pressing on the lower part blood flowed freely from above. The wound was plugged with aseptic gauze. The temperature sank at once, and remained normal from the tenth to the sixteenth day after the operation. Patient felt well, but the swelling and painfulness, wandering from one joint to another, being most pronounced in the shoulders and wrists, continued. Dressing first changed on the fifth day. Wound looks healthy. The sinus is hard, evidently containing a thrombus. The background of both eyes shows dark, enlarged, and tortuous veins, and beginning of choked disc. In the region of the internal jugular down the neck, neither swelling nor tenderness. Up to the sixteenth day general condition good, joints the same, rather improved. Distinct choked disc in both eyes on the twelfth day. The sinus lay as a slightly swollen red mass in the centre of the healthy wound. It has a solid, fleshy feel, without pulsation. The right side of the head along the track of the transverse portion of the lateral sinus, from the upper knee of the sigmoid to the torcular of Herophilus, was distinctly tender on pressure. With this exception, which indicated the existence of thrombophlebitis, the case looked satisfactory.

August 12th.—Dr. Fred. Whiting saw the patient with me, in consultation. We both were of the opinion that for the present no other operation nor any change of treatment was called for, but if there should be an aggravation of the symptoms pointing toward thrombosis, the transverse sinus should be exposed, opened, and cleansed. With this conclusion I gave the treat-

ment of the patient into the hands of my son (Arnold H.), myself to spend a two weeks' vacation in Eastern Canada.

August 17th.—Patient did beautifully until to-day, when the temperature rose to 103° at 5 P.M., to 105° at 10 P.M., pulse 120. Optic discs markedly swollen, great prostration, chilliness, insomnia, vomiting, headache, pain in joints. The patient's brother had been informed of the necessity of another operation; Dr. Lewis, telegraphed for, had arrived.

August 18th.—Temperature, 105° . **Operation** (by Dr. A. H. K.). Ether. The granulations on the sinus were scraped away; free bleeding. Sinus wall exposed. At the upper end and back part the sinus showed a distinct yellowish purulent spot. The transverse sinus exposed backward for 2.5 cm. The sinus was then opened throughout its exposed portion, about 7 cm ($2\frac{1}{2}$ in.). In the vertical part the wall was thickened, and on the inner side covered with granulations. No bleeding and no pus. On opening the sinus farther back free hemorrhage took place from the petrosal and lateral sinuses, which were plugged. Then the vertical part of the sinus at the lower end of the wound was exposed and opened; no hemorrhage. At that time the patient's condition became so bad—face pale, respiration poor, almost no pulse—that the operator immediately proceeded to infuse a litre of salt solution into the vein of the arm. The pulse improved, but the general condition did not permit of further operating. He was hurried to bed, had a distinct chill, with rapid respiration. His condition was very critical until 9 P.M. when he began to rally. Stimulation was kept up all night, and in the morning his temperature was 100° , his pulse 110, and of a fair quality. In the evening of August 19th he was in good spirits though weak, and very thirsty all day. Pulse and temperature are the same (see chart). "I think he will now get over the effect of the operation," my son wrote me, "but whether we have gotten at the root of the trouble is another question." (The operation was done in the operating-room of the New York Ophthalmic and Aural Institute, assisted by Drs. F. P. Lewis, Edwin Cox, the house-surgeon, I. Ledermann, and others.)

August 26th.—Patient has gradually gained strength. The temperature, 103° after the operation, has gradually fallen to normal (see chart). Pulse, 90. Has suffered great pain in joints of right wrist and left shoulder and ankle. Steady improvement. Wound granulating well. Optic discs and adjacent retinae still

swollen and whitish-gray, veins uniformly dark and tortuous (engorged, not thrombosed), some hemorrhages at the periphery of the optic disc. In the centre of the wound there is an evenly hemispherical, pulsating elevation, the exposed surface of the sigmoid sinus. The skin of the fourth and fifth fingers of the right hand is numb—anaesthesia of ulnar nerve.

September 16th.—All the symptoms steadily improving. The gradual diminution of the choked discs has been very interesting and gratifying to watch. Wound healing rapidly. The skin behind the sigmoid sinus, where the portion of the transverse sinus had been removed, was raised and swollen after the last operation, bridging over a recess from which a small quantity of pus escaped on pressure.

September 22d.—From this fistulous recess a small piece of loose bone was removed with a sharp curette.

September 28th.—Discharged from hospital. Wound has healed perfectly with the exception of the fistula, from which still a drop of pus exudes daily. The middle-ear cavity dry. Optic neuritis but little pronounced. Acuteness and field of vision normal. The patient's general condition remarkably improved. He has gained flesh; his functions are normal. He feels the pleasure of convalescence.

Dr. Lewis, under whose care he returned, has kindly kept me informed of his condition, which was fast advancing to perfect restoration with the exception that the subcutaneous fistula was slow in closing. November 18, 1898, it was about $\frac{1}{2}$ inch in depth; the probe touched bare bone which was neither movable nor did it seem necrosed.

Nov. 21, 1898. Patient seen to-day. Health good. The wound healed; a portion in its centre is yielding, lacking the support of bone. The fistula is 1.5 cm. deep, smooth everywhere, apparently closing up. The introduction of aseptic gauze to be replaced by the insertion of a perforated silver tube, until the healing from the bottom of its closure is completed. The optic discs by a slight haze or venous congestion still indicate the former presence of optic neuritis; no atrophy; sight normal.

Dr. Lewis informed me in May, 1899, that the fistula had permanently closed by the end of December, and that the patient had resumed his studies and enjoyed good health.

Remarks.—The history of the preceding case is long and

the patient had to submit to 5 or 6 surgical interferences, yet he made a perfect recovery. Both the number of operations and the happy issue depended greatly on the nature of the affection. It is well known that sinus thrombosis which prevalently shows articular metastases gives a better prognosis than thrombosis with pulmonary metastases. The milder and more protracted symptoms of the former do not prompt the surgeon to resort to so quick and radical treatment as when he has to deal with the latter. In the above case the symptoms slowly and by jumps developed to a high degree of danger, requiring as extensive operating as if it had been a freely infective thrombosis, yet there never appeared an involvement of the internal jugular. The lateral position and the fibrous nature of the clot, peculiar to the cases of articular metastases, manifested itself distinctly in the last operation but one. The phlebitis of the transverse portions could, however, soon be made out by the painfulness on pressure along the course of the transverse sinus, and foreshadowed already the probable necessity of another operation, which chills and a sudden rise of temperature in a week made inevitable. On exposing the transverse portion a puriform thrombus was found and removed with a portion of the sinus. This was the beginning of the recovery, which was slow, but steady and complete. During the severer period of the disease the onset, increase, and decline of the toxic condition of the blood could be ophthalmoscopically followed by watching the accompanying neuro-retinitis in both eyes.

THE MAGNIFIER IN OTOSCOPY.

BY DR. GEORGE BOENNINGHAUS, BRESLAU.

Translated by Dr. C. M. CULVER, Albany.

A CERTAIN risk is run in asking renewed attention to a matter that has lain for years in the garret of science, forgotten by the elders and unknown to the younger, of which the value or worthlessness has not been finally settled but whose place in attention has been usurped by matters of present interest. The conviction, however, that the old thing is a good one, gives me courage to seek to bring under consideration the examination of the tympanic membrane and its immediate environment by the aid of a magnifier.

The first question to present itself is this: IS IT WORTH WHILE TO EXAMINE THE PARTS, ABOVE MENTIONED, OF THE EAR, UNDER MORE FAVORABLE CIRCUMSTANCES THAN ARE POSSIBLE WITH THE UNAIDED EYE? In view of the smallness of the parts in question and their frequently minute changes, this question can hardly be answered negatively. The otologists who have invented instruments for magnifying the images of the drum membrane have done so certainly because they found the unaided eye inadequate to this purpose. The testimony of the otologists who have represented best, in pictures, the tympanic membrane—those who have made the atlases—is certainly most trustworthy in this connection. The artist and painter can of course represent exactly only what they have seen exactly. Politzer says, in his atlas: “Heretofore, less significance has been ascribed to the diagnostic importance of enlarging

images of the drum membrane than belongs to it as a matter of fact. By the use of proper magnifying apparatus it is possible to bring to notice, with surprising clearness, a number of minute details, which in ordinary examination escape attention." And Buerkner¹ says, in Schwartz's *Handbuch* :

"Among other things it is desirable, in order to observe fine changes in the tympanic membrane, to enlarge the image of it."

What is so advantageous to the practised eye of the master must be much more serviceable to the novice ! When I began, ten years ago, to busy myself with otology, although I examined and treated the considerable number of ear cases of the Augusta Hospital, many a picture of the membrane remained indistinct to me, in spite of the best intentions on my part, because I had brought from the university only a general notion of the appearance of the tympanic membrane. In this need, I made use of the magnifying lens, after the method of its use with the ophthalmoscope, when examining the inverted image, saying to myself : "If this method is so useful when examining and studying corneal changes, why may it not be equally so when the object of examination is the drum membrane ?" I remembered that foreign bodies and minute vessels that might escape the notice of the experienced oculist, were, with the magnifier so used, evident to the veriest beginner. And behold ! it worked excellently for the drum membrane.

If the question already asked must be affirmatively answered, what shall we do with the next, viz. : *Why, then, has the magnifier so few friends ?* For, so far as I can learn, the loupe is, at least in Germany, scarcely at all used as above suggested, and is usually regarded as a superfluous instrument. As quite separate from the ear speculum, Cleland used it in 1741 and Delean in 1823. As regards the later instrument, in which the convex lens was attached to the ear speculum in some way, the answer is easier than when the

¹ The pertinent literature not mentioned in the text is summarized by Buerkner in the thirteenth chapter of Schwartz's *Handbuch*. Besides that, the author has consulted the text-books of Hartmann, Jackson, Politzer, Schwartz, and Urbantschitsch, and Politzer's and Buerkner's atlases.

reference is to the detached lens, since these combined instruments are inconvenient for practical use. Since the separate lens and speculum are, as Buerkner remarks, in many points superior to any of their combinations, it seems only a matter of wonder that any of the combined instruments should have been devised. The probable explanation of their invention is that those who used them were not accustomed to hold the reflector by the head but held it with one hand, hence had only the other, single hand with which to hold both speculum and magnifier.

Before entering upon a discussion of the details of the use of the loupe, let me venture the suggestion that whoever will interest himself in this matter shall not seek the aid of a text-book on physics and its formulas, but shall take the loupe itself and any book he pleases, and prove what can be done by magnifying the print itself.

Now if one looks at the print, by daylight or lamplight, with a loupe of three inches' focal distance,—the strength that, as will be shown further on, is most suitable in otoscopy,—when the lens is less than three inches from the print, the latter is seen magnified in its erect image. The magnification diminishes as the lens is approximated to the print, increases as the lens is withdrawn from the print, and when the two are so far apart that the image is more than its focal distance from the lens, the image becomes indistinct, and is finally inverted. When the observer's eye is near the magnifier, a whole page of the book is visible to it; when farther away, only a few letters can be seen. But aside from this diminution of the field of vision, no other change occurs, for the magnification which one thinks one perceives when the distance between the observing eye and the lens is greater, is only apparent and produced by the fact that the few letters seen when the eye is farther from the lens are estimated, because they fill the whole area of the lens, as larger than the many letters seen when the observing eye is nearer the loupe.

Brunton's otoscope, which has the magnifier without the forehead reflector, is constructed according to this principle. This apparatus renders good service, and Voltolini was

so pleased with it that he had the speculum made air-tight, provided it with another side-opening, and produced the pneumatic speculum. With the usual reflector employed in otoscopy, having a focal distance of ten to fifteen centimetres, let the light be thrown on the print and the head held so that the print is most brightly illuminated. If the magnifier be now held within its focal distance between the reflector and print, the latter is seen not only magnified but most intensely illuminated, much more than is possible with the reflector alone, since the light-collecting power of the lens is added to that of the reflector. Reference to the good quality of the magnifier of intensifying the illumination, is as little found by me in otologic literature as are others of its good qualities which are to be discussed later. It was according to this principle that Weber-Liel devised his otoscope in 1863, in which the magnifier was held near the outer opening of the ear speculum by the horizontal rod. Trautmann modified this in 1873, doing away with the rod and having the biconvex lens screwed on the proximal end of the speculum, and, to avoid reflexes from the loupe, somewhat obliquely to the axis of the speculum. Auerbach seems to have changed it somewhat again in 1876, when he exhibited his form of it to the meeting of natural historians at Hamburg: the transactions are not accessible to me. Rossi described a similar device in 1896.

All fixed magnifiers are less valuable for use than are those that can be moved from side to side, and for that reason.

Next comes to attention parallaxic movement, which is used in measuring the depth of excavation of the optic nerve disc: this is equally applicable for the use of the magnifier in otoscopy. By this means it is easy, for instance, to estimate the distance of the edge of a perforation from the promontory.

A further advantage of the magnifier is its prismatic effect, which enables us to practically see around a corner. This quality is used in ophthalmoscopy, likewise, to bring parts of the ocular fundus into the observer's field of vision from behind the pupillary edge of the examined eye. In order to study this appearance, two pages of the book should be held

with a short interval between so that the upper edge of the nearer page shall just hide the upper edge of the farther. If the nearer page be regarded through the magnifier, not through its middle but its upper half, the farther page is also seen, and more of it in proportion as one looks through the magnifier nearer its edge. If it were sought to do all this with the apparatus in looking at the tympanic membrane, it would be requiring of the magnifier an impossibility, because of the intervention of the external auditory canal; still, with the proper use of the prismatic qualities of the lens, it is possible, sometimes to see through a perforation of the tympanic membrane, and study even the finest details of the fenestrum ovalis, which without its aid might have entirely escaped attention.

To recapitulate the advantages which the combination of the magnifier and reflector have over the use of the latter alone: Enlargement of the image of the tympanic membrane, stronger illumination of the same generally and especially of its extreme edges (prismatic effect), and bringing out more clearly of the dimension of depth (parallactic shifting). The focal distance of magnifier for use in otoscopy has certain limits; if the length of the auditory canal be estimated as $2\frac{1}{2}$ cm, and the length of that part of the speculum which is outside the canal likewise $2\frac{1}{2}$ cm, then the lens may be used conveniently at a distance of about six centimetres from the tympanic membrane. Inasmuch as a convex lens enlarges the erect image when the object viewed is within its focal distance, so a lens must be chosen whose focal distance is more than six centimetres. It must not be of greater, either, else will the magnification and illumination be too weak. Heretofore I have uniformly used a lens $7\frac{1}{2}$ cm focal distance, that is of 13 dioptries, which, when using the reflector, produces a magnification of about $2\frac{1}{2}$ times, according to Trautmann. The most acute glass that can be used is one of about $6\frac{1}{4}$ cm focal distance, or 15 dioptries, which produces a magnification of about $3\frac{1}{4}$ times. It is, however, more practical to choose that of $7\frac{1}{2}$ cm focal distance, since it admits of greater distance between itself and the speculum, and is moreover usually furnished with the

ophthalmoscope, hence the practising ophthalmoscopist has one, and the general practitioner likewise, if he uses the ophthalmoscope at all, and it is not necessary to get an extra lens. The most convenient form for otoscopy is a lens framed in gutta percha with a small handle, such as is found in the case of Liebreich's ophthalmoscope. The method of use of the lens is very simple. It is quite a customary method. It is also necessary in using it that hyperopes and presbyopes, as well as those having a high degree of myopia, shall have the proper correcting glass behind the aperture in the reflector; then the magnifier is held with the free hand about a centimetre from the trumpet end of the speculum. If reflections from the magnifier are still troublesome, they are disposed of by holding the magnifier somewhat obliquely to the axis of the speculum.

In order not to be misunderstood, I would like to adduce a few examples of cases in which the magnifier is to be chosen, and some in which it is not to be chosen. It is not adapted for the examination of great surfaces. The beginning of an examination should be made without it. When we care to view single points especially, the loupe becomes useful. The magnifier triumphs especially in the study of perforations. Differentiating between perforations and scars, in cases of strong retraction of the membrane, is much aided by the magnifier. Examples of the applicability of the magnifier in otoscopy could be readily multiplied.

The question of doing finer operations on the tympanic membrane with the aid of the magnifier now presents itself. There is nothing to hinder this; only there must be enough room through which to introduce the angularly bent instruments. Voltolini arranged the Brunton magnifier so that this was possible, and Dundas Grant, according to Politzer, uses a divided speculum, somewhat like the Weber-Liel otoscope. I believe that Grant's form of the operation-speculum is very advantageous; at least one disadvantage is disposed of, which the simple magnifier has in operations, which consists in the fact that a second person is necessary for the holding of the ear speculum. At the same time, to dispense with an aid oftentimes leads to regrettable consequences. I believe

that in many cases the simple convex lens of $7\frac{1}{2}$ cm focal distance is advantageously applicable in otoscopy. The advantage of its use will indeed be less for the experienced otologist, yet such a one will often find cases in which the magnifier will seem to him indispensable. On the other hand, the facility which the use of the magnifier assures to the novice is so great that, when instruction in otoscopy is begun, this apparatus ought certainly to be recommended to him. Things that he cannot see without the loupe he certainly oftentimes can see with it.

A CONTRIBUTION TO THE STATISTICS OF THE
DANGEROUS COMPLICATIONS OF SUPPURATIVE
EAR DISEASES AND OF OPERATIONS ON THE
MASTOID PROCESS.

BY DR. M. TEICHMANN, BERLIN.

Translated and abridged by Dr. JULIUS WOLFF, New York.

THE object of the following statistical reports is to draw attention to several hitherto insufficiently considered points, which may have a causative relation to the dangerous complications of suppurative ear disease, and, therefore, may at times demand consideration in the attempts to avoid these complications. The figures are drawn from the official returns made by the hospitals to the Bureau of Statistics of Prussia, and the following three groups of cases are used as a basis:

- A. 709 cases of operation on the mastoid process during the year 1894.
- B. 930 cases of operation on the mastoid process during the year 1895.
- C. 111 deaths from complications of suppurative ear disease during the years 1893-1895 (without operation).

It is very much to be regretted that, owing to defective filling out of the statistical blanks, the information derived was far less than expected. But even this incomplete material suffices to show from what different points of view such cases can be grouped.

Of the total 1750 cases included in groups A, B, and C, 62.1 % were males and 37.9 % females. These figures correspond to the participation of the two sexes in suppurative diseases of the ear and temporal bone in general.

In calculating the distribution of cases to the various ages, the following periods of life are differentiated:

From 0-1 year: infancy.

" 2-5 years: early childhood, rich in infectious diseases.

" 6-14 years: school-days.

" 15-20 years: puberty.

" 21-30 years: early manhood.

" 31-50 years: ripe manhood.

" 51-70 years: period of senile changes.

Above 70 years: extreme old age.

It has been found that *more than half of the cases* (56.6 %) *belong to the periods from 6 to 30 years*, while 71.8 % belong to the years 0 to 30.

In computing the frequency with which each ear participated in the dangerous complications, unfortunately the returns of the year 1895 only were considered. Of 462 complications (operations and deaths without operation), 207 (= 44.8 %) affected the left, 229 (= 49.6 %) the right, and 26 (= 5.6 %) both ears. No importance must be attached to the apparent preponderance of the right side, as the number of cases is too small.

In only 665 of the whole number of cases the returns stated whether the suppuration was acute or chronic. Out of this number 24.9 % were acute and 75.1 % were chronic. *From this it may be assumed that about three quarters of the dangerous complications follow chronic purulent otitis, and only one quarter the acute.* As only 16 cases of group C are included in the above 665, the number is too small to permit any conclusions to be drawn in regard to the mortality in acute and chronic cases without operations.

The *cause* for the suppuration underlying the dangerous complications was mentioned in 236 cases. Scarlet-fever was named in 29.2 %, influenza in 17.8 %, scrofula and tuberculosis in 16.1 %, diphtheria in 10.6 %, measles in 8.0 %, and colds, typhoid, syphilis, whooping-cough, trauma, and various other diseases in the remaining 18.3 %. Thus it will be seen that the acute infectious diseases of childhood (scarlet-fever, measles, diphtheria, and whooping-cough), with scarlet-fever leading, are the cause of the primary suppuration of the ear in almost half of the cases (48.7 %).

The figures were too small to allow positive conclusions to be drawn in regard to the relation of the various causes of the primary ear trouble to the course of the suppuration up to the time of the complication. But so much may be said, that the suppuration in influenza-otitis almost always runs an acute course up to the inception of the dangerous complication, while in the otitis of scrofula and tuberculosis, diphtheria and measles, it runs a chronic course.

The main interest in the gathering of these statistics centers in the question whether some occupations may exert a harmful influence on the occurrence of dangerous complications in suppurative ear disease. A tabulation of the cases according to the occupation of the patients shows a marked preponderance of certain industries. The ones that contribute more than the average of cases are the farming and metal industries, the tradespeople, officials, builders, wood-workers, domestics, and the textile industries. It must be remembered, however, that chance may play an important part here. Only if the number of those suffering from suppuration of the ear in each industry were known, we could form a judgment in regard to the tendency towards complications in each one.

By making use of the figures of the industrial census for 1895 I have computed the relation of the above cases and deaths to the total number of persons employed in each occupation. The results show again the greater participation of the metal, textile, and wood industries, the tradespeople, domestics, and officials; for to each 10,000 persons in these occupations there are from 0.89 to 3.70 individuals with the suppurative ear disease and complications. On the other hand the farming and building industries this time fall far below the average, whereas the sedentary occupations requiring much writing here contribute twice as many cases as the average.

This brings us to the question whether *social position* exerts any influence in the developement of dangerous complications after ear suppuration. At first thought one would be inclined to suppose that those of lower social position would pay less attention to their ailing and hence be more

subject to the complications than those better situated. The figures, however, do not substantiate this, for those who have an independent position show as large a percentage as the skilled laborers and twice as large a percentage as the day-laborers and domestics. These data prove the old experience that the significance of ear suppuration in respect to health and life is still underestimated even in the so-called better classes.

Finally the results of the operations performed in groups A and B remain to be reported. Of the 1639 operations, 154 ended fatally, 8 of them, however, from causes not connected with the operation. The average mortality for the various periods of life as subdivided above was 8.9%, the largest percentages of deaths belonging to the periods 0-1 year and 51-70 years with over 15% each.

In only 66 of these 146 deaths it could be ascertained whether the suppuration had been acute or chronic, namely 12 times (=18.2%) acute and 54 times (=81.8%) chronic. All these figures are, however, too small to determine the greater or less effectiveness of the operation or its dangers in various periods of life. Still it may be stated that of 37 operated cases of tuberculous ear suppuration, 5 (=13.5%) died, while of 65 operations for scarlatinous suppuration only 3 (=4.6%) died.

The foregoing statistics simply indicate with what practical points in view a carefully recorded material can be made use of, and if this stimulus given to aurists and hospitals shall fall on fertile soil, a new consideration of the questions here brought out will after several years doubtless be productive of better results.

PERCUSSION OF THE MASTOID PROCESS.

By DR. H. EULENSTEIN, FRANKFURT-A.-M.

Translated and abridged by ADOLPH O. PFINGST, M.D., Louisville, Ky.

WHEN Michael (1), in 1876, came to the conclusion that no information could be elicited by percussion as to the condition of the mastoid, because of the resonance of the buccal cavity, he was under the impression that the difference in the percussion sound was dependent upon the size and condition of the pneumatic spaces of the bone. His examinations were all made upon healthy mastoids.

Wild and Körner (2) have since then (eighteen years later) shown by experiments upon the cadaver that variations in the percussion sound occur independent of the air cells, and are often due to disease of the bone substance. Based upon two cases, in which the conditions were confirmed by subsequent operations, they ventured to establish the maxim that "it is sometimes possible by bone percussion, according to Lücke, to diagnosticate acute central otitis of the mastoid at a time prior to other manifestations of the trouble." Wild (3) subsequently published another case in support of this view. While substantiating the views of Wild and Körner, Moos (4) made the point that percussion was of value only when it gave positive results, or, in other words, that disease of the bone could exist without altering the character of the percussion note. In 1894 (5) I published the results of the examination of ten cases of acute disease of the mastoid, in which I arrived at the following conclusions:

I. By means of percussion (compared with that of the

other side) a positive diagnosis of a diseased condition of the mastoid can be made—provided dulness is elicited.

II. Dulness on percussion indicates the presence of a diseased area near the surface of the bone, the degree of dulness depending upon the extent of the area involved.

III. The absence of dulness is no proof that the bone is not diseased.

IV. Where other symptoms of mastoid disease are present and there is no dulness on percussion it indicates that the diseased area is either very small or deep-seated.

Haug (6), and in fact all of the late investigators, with the single exception of Weygandt (7), have substantiated these results. The latter discredited the value of this method of diagnosis entirely, because, as he says, "dulness is often wanting in inflammation of the mastoid, while it may be present in a number of other affections of the bone." If the change in the percussion note were our only means of diagnosis, this argument of Weygandt might be considered, but it stands to reason that this is but an auxiliary to the subjective and objective symptoms. We could as well say that the dulness on percussion in pneumonia was of no diagnostic value, simply because it also occurs in a variety of other affections.

In summing up the result of his research, Weygandt says that *marked* dulness was present, (a) always in abscess of the middle ear with perforation of the drum and pus sufficiently abundant to fill the tympanum and external ear canal; (b) in a girl, eleven years old, upon whom a mastoid operation had been performed two years previously, and in whom an indrawn scar showed the absence of pneumatic cells; (c) in complete occlusion of the external ear canal by cerumen, foreign bodies, furunculosis, tumors, etc.; (d) and in tumors of the middle ear.

As these results are contradictory, little value can be attached to them in determining the worth of percussion in the diagnosis of mastoid disease. If, for instance, dulness was marked in every case of suppurative middle ear in which the tympanum and ear canal was filled with pus, this must, according to his other conclusion (c), be due to the

occlusion of the ear canal by pus, and not merely, as Weygandt suggests, to the middle-ear abscess. In a number of such cases which I examined after cleansing the ear canal and tympanum of pus, dulness was never present, a fact also noted by Wild and Körner. In the case of a depressed scar after operation, mentioned by Weygandt (*b*), the new dense connective tissue which replaced the bone accounts for the dulness, and not, as he thought, the absence of air cells. As to the presence of occluding substances in the ear canal, even should we concede that they cause dulness on percussion of the mastoid, they could readily be recognized by simple methods of examination and be removed. Certainly no one would make a diagnosis of mastoid disease because there was dulness on percussion without regarding other signs and symptoms.

Entering a little further into Weygandt's paper we find that *slight* dulness was elicited by him on light percussion with the finger in :

- (*a*) Pathological conditions of the drum membrane;
- (*b*) Catarrhal conditions of the Eustachian tube;
- (*c*) Narrowing of the ear canal through portions of wax, or by furunculosis in the stage of repair.
- (*d*) In the single case of mastoid inflammation reported by him.

These results are also contradictory, and consequently unreliable. In either of the first three conditions (*a*, *b*, and *c*) there would be other signs and symptoms by which mastoid inflammation could be eliminated, while his single mastoid case could not be taken as a criterion as compared to the large number that have been observed by other authors. But aside from this, his results would not hold, as there was œdema over the mastoid, which, according to all other observers, masks any difference that might exist in the percussion sound. Weygandt admits that he was not able to percuss the mastoid satisfactorily owing to its extreme tenderness. His previous conclusion (*c*) that *marked* dulness is always present in middle-ear abscess with perforation of the drum and filling of the tympanum and ear canal with pus, is directly contradicted by this case, in which all of the

conditions cited were present, notwithstanding which there was but *slight* dulness on percussion of the mastoid. Weygandt based his conclusions that percussion was useless as a means of diagnosis of mastoid inflammation upon the fact that dulness could be due to a number of other causes, and that it was not always present in mastoid inflammation. He failed to mention the explanation which I had offered in my first paper for the absence of dulness in three of my cases—or in fact where the percussion note was a little clearer if anything than on the other side. In the first of these, the diseased area was not larger than a pea, and was deeply situated. In one of the others, pus and granulation tissue was limited to the mastoid antrum, while in the third case the diseased portion was not only deep-seated, but was surrounded by hard, compact bone. From one of the above facts, and considering that Weygandt believes the changes in the percussion sound to be due to variation in the pneumatic cells, and not as is now generally believed to disease of the bone substance itself, little weight can be attached to his observations in disproving the value of percussion as a means of diagnosing disease of the mastoid bone.

In considering recent literature in support of the method of percussion, we find an instructive case bearing on the subject reported by Körner (8) in which a decided change in resonance from a clear to a dull note was observed over the diseased mastoid, the integument over the bone being in a normal condition. A similar case was reported in my previous publication, dulness on percussion being the first sign of mastoid inflammation. Since then I have had occasion to observe a number of cases of acute mastoid disease in which the soft parts covering the mastoid had not been involved, the diagnosis resting on the dull percussion note. I am led to believe that these conditions would be encountered oftener if the operation were performed as soon as dulness was evident along with other cardinal symptoms of mastoid disease.

The ten following cases, which represent only those in which full notes were made during the progress of the disease, are of interest in this connection.

CASE 1.—Male, fifty-two years old, operated upon six weeks after beginning of the otorrhœa. Acute abscess of right middle ear, with small perforation of drum. Tenderness over mastoid on pressure, soft parts over the bone normal. Marked dulness on percussion over the diseased mastoid as compared to the other bone. At operation a large area of diseased bone was found several millimetres from the surface, and extending to the antrum, very close to the ear canal, and almost to the tip of the mastoid.

CASE 2.—Twelve years old, otorrhœa of six months' standing R. and L. Granulation tissue in external ear canal covered drum. Left mastoid very sensitive to pressure, no swelling of integument. Marked dulness on percussion. At the operation granulation tissue and pus filled nearly the entire mastoid, extending to the antrum and near to the ear canal.

CASE 3.—Female, thirty-two years old, operated on three weeks after beginning of otorrhœa. Acute suppuration of right middle ear. A large perforation in posterior segment of drum. Mastoid sensitive, no involvement of the integument. No dulness on percussion. Dulness was not apparent until two weeks later, and not marked for almost another week. At the operation pus and granulations were found extending through the entire mastoid down to the tip, into the antrum, and to the transverse sinus.

CASE 4.—Seven years old, otorrhœa after scarlet-fever, with good-sized perforation in lower part of the drum. Mastoid tender in region of the mastoid fossa. No swelling over the mastoid. Change in the percussion sound did not take place for five weeks, when it was marked. The mastoid was then opened and a large superficial area of granulation tissue, but no pus, found.

CASE 5.—Male, nineteen years old, operated seven weeks after beginning of an acute middle-ear suppuration on left side. Large perforation of the drum behind the manubrium. No swelling over the mastoid, slight tenderness on pressure. Tenderness later increased and with it appeared dulness on percussion. Operation revealed a superficial, extensive area of pus and granulation tissue.

CASE 6.—Male, five years old. Acute abscess of right middle ear. Operated three weeks after beginning of the otorrhœa. Paracentesis five days before the operation, the perforation in the drum having closed. No tenderness over mastoid, no swelling, and no dulness on percussion at that time. Three days later there was tenderness on pressure, pyæmic temperature, and dul-

ness on percussion of mastoid, though not marked. The operation revealed under a plate of healthy bone a large area of grayish-white, soft bone extending from the temporal ridge to the tip of the mastoid.

CASE 7.—Male, twenty-eight years. Acute suppurative inflammation of both middle ears. Operation four weeks after beginning of the trouble. Left, rapid recovery. Right, perforation in lower and posterior quadrant of drum. Tenderness over right mastoid. No swelling over mastoid but some just behind it, near the emissary artery. Marked dulness over the mastoid on percussion. The entire bone was found soft at the operation, granulation tissue extending throughout the mastoid process to the lateral sinus and into the antrum.

CASE 8.—Male, sixty-two years old, operated six weeks after first symptoms — deafness, tinnitus, and earache, following coryza. Left primary otitis of the mastoid without inflammatory symptoms of the middle ear. Drum intact. Ear canal slightly swollen in the upper posterior portion. Tenderness on pressure over the mastoid. No swelling of the integument. Urine normal. Dulness marked over mastoid on percussion. A large area of mastoid was found occupied by granulation tissue at the operation.

CASE 9.—Forty-six years, operation sixteen days after first earache. Primary otitis of right mastoid without suppuration of the middle ear. Repeated paracentesis of the swollen drum membrane without finding pus. Mastoid painful to pressure, no swelling. Ear canal posteriorly and upwards slightly swollen. Markedly dull percussion note over mastoid. A superficial area of diseased bone extending throughout the entire mastoid was found at the operation.

CASE 10.—Twenty-eight years, operated four days after beginning of an acute purulent middle-ear inflammation on right side. Perforation of the drum in upper posterior portion, with small polypus protruding. No swelling over mastoid or tenderness. Percussion elicited a clear note early in the course of the disease, but after three and a half weeks was markedly dull. There was then also pain on pressure over the mastoid fossa, and tip of the mastoid. No swelling. At the operation it was found that the bone was very vascular, and soft, and was invaded by granulation tissue. Granulations and pus extended into the antrum and to the sinus. Between the eroded bone and sinus was an extradural abscess.

Of particular interest among these cases are those in which the character of the percussion sound changed from a clear to a dull note, of which I can cite seven, Nos. 3, 4, 5, 6, and 10, of the above cases, one from my previous publication, and a recent case of Körner. Cases 8 and 9, and also Case 10 of my other series, of primary otitis without middle-ear abscess, were also instructive and demonstrated well the value of percussion as a diagnostic means. In Case 2, in which otorrhœa existed on both sides, the change in the percussion sound was an invaluable aid in determining which mastoid was involved. The healthy cortex of bone covering the diseased area in Case 6 accounts for the dullness being less marked in this than in the other cases.

The subject of my paper furnishes I think a good field for further investigation, though even now sufficient cases are on record to demonstrate the value of percussion in the diagnosis of mastoid disease. It gives us a means of recognizing mastoid disease earlier than was heretofore possible, and adds a valuable adjuvant to the indications for opening the mastoid.

LITERATURE.

1. *Arch. f. Ohrenheilk.*, Bd. 11.
2. *Zeitschrift f. Ohrenheilk.*, Bd. 23.
3. "Bericht über d. II., Vers. d. d. otolog. Gesellschaft," *Arch. f. Ohrenheilk.*, Bd. 25.
4. *Zeitschrift f. Ohrenheilk.*, Bd. 24.
5. *Monatschr. f. Ohrenheilk.*, 1894, No. 2.
6. *Arch. f. Ohrenheilk.*, Bd. 39.
7. *Inaugural Dissertation*, 1895.
8. *Zeitschrift f. Ohrenheilk.*, Bd. 35.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF JANUARY 24, 1899.

BY DR. H. A. ALDERTON, SECRETARY.

President, Dr. C. J. KIPP, in the chair.

Dr. KNAPP asked for discussion on the **pathology and management of mastoid empyema in children**. Also as to point of origin. There is often a very large destruction of bone and exposure of the dura. Lately he has operated on five children. In the recent cases with caries confined especially to the upper part, the suprameatal cells, a fistula was left which was most obstinate in closing; this fistula was the aditus. Five days ago operated on a child eleven months old, with considerable mastoid swelling, no middle-ear disease, no discharge, no prolapse of wall of canal. Found subperiosteal pus, outer surface of the bone over antrum rotten, carious enlargement of the antrum, granulations in the attic—this was the seat of the disease. The pus had made its way posteriorly instead of into the tympanum. It may be necessary for a cure to curette the whole attic, but he did not do it in this case, in order to preserve the hearing; he simply removed the granulations. From three to six months has been required to heal up these fistulæ in similar cases. In the great majority the pus comes from the attic through the antrum to the squama and does not affect the parts below. In other cases the perforation takes place through the posterior wall of canal. Thorough curetting superficially often brings about a cure. The original trouble is transmitted from the Eustachian tube directly to the attic, sometimes without affecting the atrium. Knapp does not advise much curetting of the attic, for the following reasons: (1)—for the preservation of the hearing; (2)—from care of the facial; (3)—because of the possibility of dehiscences of the tegmen tympani.

Dr. FRIDENBERG asked as to the appearance of the tympanic membrane in the reported cases. Dr. KNAPP stated that they were somewhat reddened but not bulging.

Dr. FRIDENBERG reported a case of **primary tuberculosis of the mastoid** in a child. Mastoid inflammation, caries, and superficial abscess was followed, not preceded, by middle-ear supuration, at first on the right then on the left side. Coincidentally cerebral symptoms developed, leading to a permanent hemiparesis. After mastoid operation the child recovered; the cerebral manifestations disappeared gradually in great part. The brain lesion was diagnosticated as a tumor of the pons, tubercular in origin. The child's father was suffering from pulmonary tuberculosis, of which he died a year later.

Dr. KNAPP thought that primary tuberculosis of the mastoid might occur, extending into the tympanum instead of outward.

Dr. TOEPLITZ thought that there was a considerable difference between the mastoiditis of infants and of small children; the bone in the former being much softer. In infants serious or even fatal bleeding may occur after operation from this condition of the bone. He thought that in the cases mentioned by Dr. Knapp the attic was not alone affected, the tympanum having a latent supuration going on, not recognized.

Dr. MCKERNON thought that in those cases in which the tympanic membrane remains intact the healing would be much facilitated and the drainage improved were the membrane freely incised.

Dr. KNAPP thought that it would be a very good idea to do this through Schrapnell's membrane, but, as a rule, when the operation on the mastoid is well done the discharge from the ear stops. Believes that the opening of the tympanic membrane is often too promiscuously done.

Dr. MCKERNON asked advice as to what should be done, after operating on the mastoid in cases of general tuberculosis, to secure healing. He had had very poor success in these cases, notwithstanding every care. Had tried packing with gauze soaked in valerianate of guaiacol, in a case of the same kind, with very good results; the granulations were more healthy, the other treatment being the same. In four months the case was entirely cured and has remained so ever since—for four months. Also good results in another case. In one case it had no effect. The mastoids were examined microscopically for the tubercle bacillus with posi-

tive results. Dr. TOEPLITZ had had good results from a different remedy—traumatol. Dr. HEPBURN thought that these results were only temporary, an arrest of the local process. Dr. MCKERNON simply reported the above as an observation not as a specific.

Dr. FRIDENBERG reported a case of **mastoiditis with a rare sequela—retropharyngeal abscess**. A man, fifty-six years of age, was operated on for an acute left-sided mastoiditis, not of the Bezold variety. He did well for about two weeks, when he developed pain, tenderness, and swelling low down in the neck, latero-posteriorly, difficulty in swallowing, and febrile temperature. These symptoms gradually increased, and swelling appeared in the right side of the pharynx. There was no pain or tenderness between the tip of the mastoid and the painful swelling in the neck. External operation released a few drachms of pus near the vertebral column and the patient promptly recovered. The case was plainly an infection and suppuration of one or more deep-seated glands, transmitted by the lymphatics or along the connective tissue, in the manner that a cerebellar abscess arises after middle-ear suppuration.

Dr. KNAPP had recorded a similar case. The patient had a severe inflammation of the middle ear, apparently with a cerebral complication. On the supposition of a brain abscess the skull was opened twice, but exploration with aspirator and knife brought out no pus. The autopsy showed purulent meningitis of the anterior lobes at the convexity and median fissure, suppuration and caries of the tympanic cavity, propagation of the pus from the attic along the *semicanalis pro tensore tymp.* to the pharynx. (See ARCH. OF OTOL., xxiv., p. 121, 1895.)

Dr. TOEPLITZ thought that Dr. Fridenberg's case resembled more a retropharyngeal abscess, the pus burrowing along the petrous bone.

Dr. FRIDENBERG stated that he had tried to make a point of the difference between his case and the ordinary *senkungs-abscess*.

Dr. ALDERTON exhibited a photograph of a case showing the results of traumatism on the auricle occurring in infancy. The patient, a young Irish girl of seventeen or eighteen, when one year old, while crawling on the cabin floor, had her **ear chewed off** by a pig. As may be seen, the entire upper three-fourths of the auricle was removed, together with the superior and posterior cartilaginous canal. The tympanic membrane was not injured apparently and the hearing remains normal.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF MARCH 28, 1899.

BY DR. H. A. ALDERTON, SECRETARY.

Vice-President, DR. H. KNAPP in the chair.

Dr. T. P. BERENS related the history of a **case of sinus thrombosis**. A. M., female, age twenty-one, came to the Manhattan Eye and Ear Hospital, January 12, 1899, complaining of pain in the right ear and that side of neck. The patient said that this pain began one week before her entry into the hospital, and was accompanied by swelling in the neck, which steadily increased, until on admission, when she presented a large swelling extending along the line of the sterno-cleido muscle down to the level of the thyroid cartilage. The temperature was $99\frac{1}{2}^{\circ}$ F. January 13th, her eyes were examined; the right eye-ground revealed a slightly hazy nerve with enlarged and tortuous veins. At noon the same day the mastoid was opened, and was found to be perforated at the tip. The perforation opened into a large abscess cavity inside of the sheath of the sterno-cleido-mastoid muscle. This abscess was opened by a free incision extending to the level of the cricoid cartilage, much of the muscle being divided. The whole mastoid process was diseased and was thoroughly curetted; the mastoid antrum being full of pus and granulation tissue. The bone was not particularly diseased over the lateral sinus, but owing to the condition of the eye the sinus was exposed and found to contain at least two drachms of pus. The sinus was exposed for nearly two inches, opened, and thoroughly curetted; the curette reaching the torcular before free blood was drawn. The curette failing to draw free blood from below even after the jugular bulb was reached, the wound in the neck was enlarged and the jugular exposed at the level of the cricoid cartilage and found to contain fluid blood. The pulse becoming rapid and the respiration shallow, time was not afforded to dissect the vein upward. Two ligatures were thrown around the vein and the vein divided between them. The wound was packed with gauze. The patient made an uneventful recovery. Immediately following the operation the temperature rose to 101° F., but the following night it fell to 99° F. It did not again rise above $100\frac{1}{2}^{\circ}$ F. during the whole process of her recovery.

The wound is closed, as you see, without a disfiguring scar. I show the case as an illustration of the fact that an important vein

may contain much pus without marked temperature disturbances. The patient was in the hospital one month only.

Discussion.—Dr. EMERSON asked Dr. Berens as to whether the patient's eyes were examined after the operation. Dr. BERENS—No.

Dr. MARPLE asked as to whether the clot extended in the jugular up to the point of ligation. Dr. BERENS—No.

Dr. DENCH asked as to whether the facial vein was tied off. Dr. BERENS—Yes.

Dr. BACON asked as to whether there was a clot in the jugular. Dr. BERENS—No. There was pus in the sinus and clot above and below.

Dr. BACON had a case at the Infirmary in which there was a slight amount of pus in the lower portion of the thrombus. He did not tie the jugular nor establish flow of blood very thoroughly; notwithstanding, the temperature fell and the patient recovered.

Dr. DENCH thought it a very nice point to decide when to ligate the jugular. He had a patient in whom the sinus was completely plugged by a clot and no re-establishment of the circulation followed curetting. Because of the age of the patient and the absence of pyæmic symptoms he did not ligate the jugular. Some few streptococci were found in the clot. Uninterrupted recovery followed. He thinks that in cases where there are no symptoms of general sepsis, it is preferable not to ligate the internal jugular vein.

Dr. GRUENING spoke of the case of a man who, after suffering from **typhoid fever followed by the grip, acquired a left otitis media**. There was much pain, T. 106° F., bulging of the membrane. The membrane was incised, serous fluid evacuated containing streptococci (long variety). No improvement; mastoid tender; temperature constantly high. Operated: pneumatic mastoid with cells filled with turbid serum containing streptococci; clotted blood. The sinus was exposed for two inches and was hard and clotted. The sinus wall was accidentally injured with flow of blood from above. No pus or granulations on the wall. Did not open the sinus. The next day the temperature was 100° F. and remained so. The thrombosed sinus was not opened; yet the patient recovered.

Dr. MCKERNON reported the history of a **case of brain abscess and pyæmic sigmoid sinus thrombosis following purulent mastoiditis (Bezold), caused by an acute oti-**

tis media ; three operations ; death. K. O., a girl, aged twenty years, first seen February 15, 1899. About four weeks before she contracted a severe cold, and the next day pain began in the ear, followed by a discharge some six days later. Before the discharge began pain interfered with sleep ; afterwards the pain abated somewhat. On February 3d the discharge stopped, and since then the pain had been very pronounced. Examination : meatus and canal free of discharge ; considerable sagging of the posterior and superior canal walls ; drum membrane bulging, especially the posterior superior portion ; marked œdema over the mastoid, extending downward into the neck ; posterior to the tip, a boggy swelling, about the size of a hen's egg, extending backward toward the occiput. This œdematous area was very tender upon pressure, and the patient carried the head well over toward the opposite side. She had had measles only, in childhood. Temperature 102.4° F., pulse 94, tongue heavily furred, with bad odor from breath.

She refused operation. The drum membrane was opened and an incision made in the prolapsed wall, and she was instructed to irrigate the canal every two hours with bichloride 1:4000, when she left the hospital.

Five days later she again came to the hospital with all of her former symptoms greatly intensified, and now consented to have an operation performed. Temperature 103.2° F., pulse 90, and she looked septic. An examination of the discharge from the left canal showed the presence of streptococci in abundance.

Operation.—Upon cutting through the periosteum a small quantity of pus escaped from the region of the tip. The cortex appeared intact, and dark in color. A small quantity of pus escaped from the antrum. The whole interior of the mastoid was found diseased, the curette removing pus, granulations, and necrotic bone. The sinus was exposed below the knee, and was markedly discolored, almost black. The sinus was accidentally opened above the knee, and profuse hemorrhage took place from the torcular side, but none from below. The portion of the sinus below the knee was opened, by slitting the dura, and a small clot of blood covered with fibrin was removed. After this removal, the return current seemed normal, and the sinus was packed in the usual manner. Continuing the removal of softened bone backward from the tip, a perforation was found leading into the bulging mass before spoken of in the occipital region. An incision, at

almost a right angle to the mastoid incision, was made over this mass, and about an ounce of dark-looking pus evacuated. The parts were flushed with sterilized water, and this followed by a flushing with absolute alcohol, the usual dressing applied, and the patient returned to the ward.

For the next four days the patient did well, the temperature ranging from 99° F to 100.4° F., pulse 94 to 100.

On the fifth day a gradual rise of temperature to 104.2° F., pulse 110; patient comfortable, bright, and did not complain. The eyes were examined by the house surgeon, who reported some redness of the optic nerves, with slight blurring of the edges.

The sixth day temperature dropped to 102° F., the patient still feeling comfortable and taking nourishment well. Dr. Dench was asked to see the case in consultation, and advised against another operation, saying he thought it best to wait and watch developments.

The seventh day the temperature rose gradually again to 104° F., pulse 102, and I decided that there was sepsis going on and determined to search for it.

Second Operation—The sinus opened at the point of the former incision, and no bleeding followed. A probe was passed backward, toward the torcular, and this was followed by quite free hemorrhage. The probe was then passed below, and from the opening made by it a few drops of pus made their way to the surface. The curette was used here, and a considerable quantity of clotted, granular material, together with fibrin and pus, was removed, after which there was free bleeding. This was controlled by a gauze wick passed down to the bulb. The field was cleansed with alcohol and a dressing applied. The patient became very weak, and twelve ounces of a hot saline solution were injected into the rectum with marked benefit. The pus from the sinus was examined, and found to contain large numbers of streptococci.

The patient passed a comfortable night and seemed bright and cheerful in the morning. The eyes were again examined, and the optic discs found markedly blurred, with veins enlarged and tortuous. The patient seemed to be improving.

Two days later the temperature rose slowly to 104° F, pulse 90, and she complained of considerable headache on the left side of the head and seemed a little dull, and at times said she felt cold

and wanted more covering put over her. These symptoms continuing throughout the day, I decided to explore further for pus accumulation.

Third Operation.—The wound was exposed and the dura around and below sinus was found to be more prominent than before. A further area of bone was removed below and posteriorly, exposing the cerebellum. An incision was made in the dura over it, and a large quantity of pus and broken-down and softened brain substance removed. The abscess cavity extended behind and around the sinus, and there was a distinct walling-off of its contents, as felt by the finger. The cavity was irrigated with a saline solution, and packed loosely with sterile gauze. On examining the bulb end of the sinus, a few drops of pus were again found, and for this reason, and for the purpose of preventing any further septic absorption, I decided to ligate and resect the internal jugular vein. This was done, ligating it just above the clavicle, and resecting to the bulb, and it was found to contain a clot for a little over two inches below the point of ligation above. Saline solution was given in the rectum, at the end of the operation, and while the patient was on the table, and she rallied well, considering the gravity of the operation and what had been done previously.

During the night she was extremely restless, and it was impossible to keep her quiet. The following day she was still very restless, with mild delirium at times. Her temperature was 104° F., pulse ranging between 80 and 86, and of very good volume, but irregular at times; kidneys acting well.

The next day she seemed better. There was no delirium; she was quiet; asked for food and said she felt comfortable. Her temperature dropped to 102.3° F., pulse 80 and of very good volume, and the tongue was beginning to show moisture, when before it had been dry. She continued improving all that day, until 5.30 o'clock in the afternoon, when she suddenly stopped breathing, and all efforts to re-establish respiration were of no avail. Oxygen and stimulation were at hand, and used persistently, with no response whatever. During all this time the pulse could be distinctly counted, and it was of fair volume. The pulsations kept growing weaker and weaker, and at the end of fifteen minutes from the time breathing ceased they stopped altogether.

We were unable to obtain an autopsy, so could not determine definitely the cause of death, but believe it to have been due to

an embolus in the respiratory centre. At the time of death the temperature registered over 107° F.

Discussion.—Dr. DENCH thought that too much importance was attached to the return flow from below; the inferior petrosal sinus will supply the flow even though the jugular is occluded. The general condition of the patient and the presence of pyæmic symptoms are of more importance in deciding as to the investigation of the jugular.

Dr. TOEPLITZ gave the history of a **case of sinus thrombosis**. A young man, sixteen years old had had a chronic right otorrhœa for one year, following which the symptoms became acute. He was operated upon twice, first by opening the mastoid and the posterior cavity of the brain, later by opening the sinus and ligating and excising the internal jugular. General pyæmia had already established itself on the day of the first operation, with the implication of a number of joints. Infarction of the right lung, with some effusion into the pleural cavity, and endocarditis developed in the course of the disease. The patient fully recovered.

Discussion.—Dr. GRUENING thought that this was a case in which the indication was to open the sinus at once. Dr. Toeplitz agreed.

Dr. BERENS stated that in his case the remarkable point was the presence of considerable pus without much temperature. Thought that it was necessary in most cases, where return flow of blood from below could not be established, to tie the jugular. Thought it necessary to open the sinus when there was thrombosis present and to establish the return flow from below and behind.

Dr. HERMAN KNAPP read the history of a **case of serous meningitis, operated upon by Dr. Arnold H. Knapp, with presentation of the brain**. R. Klepky, one year three weeks old, admitted March 20th. Healthy parentage. Said to have had pain in the left ear for two months. A swelling above the mastoid was incised by the family physician. She did well until one week ago; since, she has appeared ill, refused food, been sleepless, vomited, been stuporous. *On admission*: Very pale, head thrown back, stuporous, crying when aroused, pupils not reacting, wound above the mastoid in a sloughy granulating condition, no carious bone, fundi normal, *Mt.* normal, no otorrhœa. A probe introduced into the mastoid wound seems to lead forward to the meatus. Operation March 21st. The fistulous tract,

which was laid open, extended to the meatus, where it was lost. The periosteum was quite thickened and the bone was everywhere normal. Antrum and middle ear exposed. No pus. The tegmina normal. Middle cranial fossa opened and the upper surface of the petrous bone found normal. From the 21st to the 26th the patient continued in stupor; no delirium or convulsions; eyes half closed; corneæ anæsthetic; no pupillary reaction; took milk well; no vomiting; pulse 140; T. 100°-101° F. 24th-26th, slight convergent strabismus; fundi normal; Cheyne-Stokes respiration; P. 150. March 26th, appeared better; respiration regular; difficulty in swallowing; convulsions set in toward night; child died at 4 A.M. *Autopsy*: 8 A.M., temporal bone absolutely normal. In the ventricles, an abnormal quantity of fluid. In the arachnoid, a few small clusters of miliary nodules (which on subsequent microscopic examination proved to be tubercles).

Discussion.—Dr. KNAPP thought that in another case he would do a lumbar puncture, expose the dura and incise.

Dr. CH. H. MAY related the history of a **case of serous meningitis, causing deafness; autopsy**, which had been observed by him for several weeks at the Mt. Sinai Hospital. Upon admission to the hospital the man, twenty-five years old, gave a history of having had some severe illness several weeks previously; headache was a prominent symptom of this disease, but no diagnosis nor particulars could be obtained. Upon admission he complained of severe pains in the head, more or less generally distributed, and of deafness. Examination of the drum membrane revealed nothing abnormal. There was absolutely no hearing in one ear and in the other merely a suspicion of faint perceptions of very loud noises. There was no elevation of temperature, pulse was normal, bowels regular. The patient was weak but able to be up most of the time. His deafness was his most prominent symptom. He claimed that he had had good hearing previous to the illness which he had some weeks before entering the hospital. Examination of the fundus oculi was negative and there were no ocular evidences of cerebral disease.

The man remained in the hospital two weeks, then suddenly developed chills, followed by an elevation of temperature (104°), drowsiness, then coma, and death followed in thirty-six hours. At the autopsy the ventricles were found greatly distended with serum in which there were a number of flakes of fibrinous character; there were no other changes.

Discussion.—Dr. GRUENING asked as to whether the *ependyma* was thickened. Dr. MAY—No.

Dr. GRUENING stated that in cases that he saw with Dr. Jane-way there was marked *optic neuritis*.

Dr. BACON presented **an electric illuminator for aural examination**. Dr. DENCH had not had very good success with electric illuminators; they were unreliable. He exhibited a **candle illuminator** with **reflector**, made by the Gorham Manufacturing Company, which was portable and utilized the ordinary coach candle.

Dr. BACON had had considerable trouble with candle illuminators. Very frequently they did not burn brightly, and they were open to objection in regard to conflagration, should the use of an anæsthetic be necessary.

Dr. DENCH asked as to whether the power was derived from a storage or a dry-cell battery. Dr. BACON—Storage.

Dr. GRUENING reported a **case of caries of mastoid affecting both sides; torticollis due to softening of bone; optic neuritis (double)**. A boy, aged eleven, was admitted to the Mount Sinai Hospital, on November 22, 1897. He suffered much from headache and had a discharge from the ears. Both mastoids were tender and the optic discs were choked. The boy remained under observation until December 2d, when a subperiosteal abscess developed behind the right auricle. The usual operation was performed on the right mastoid. Though the healing of the wound progressed favorably, a marked torticollis of the right side made its appearance, and the right post-mastoid region became tender. On December 16th it became necessary to operate upon the left mastoid process. Both mastoid wounds showed a tendency to heal normally, yet the right torticollis and the tenderness behind the right mastoid process persisted. The boy continued to complain of headache; optic neuritis was still present, but vision was normal. On December 27th the wound over the right mastoid was reopened and increased in size by a transverse incision posteriorly. The bone covering the sigmoid sinus and the dura mater of the posterior fossa was soft, succulent, yet bloodless over an area of two square inches. All this diseased bone was removed. On October 30th the torticollis had disappeared and the neuritis was less pronounced. February 3d, 1898, boy discharged, cured.

Discussion.—Dr. DENCH stated, with reference to the occurrence

of optic neuritis in the cerebral complications of otitis, that if the current in the sinus is shut off, optic neuritis is bound to be present.

Dr. GRUENING thought that *torticollis* might be brought about by disease of the bone to which the muscle was attached. Why the boy should have had neuritis is not so clear (may have been due to auto-infection?).

Dr. BACON spoke of a **case of Eustachian-tube catarrh** that he saw some time ago in consultation. Vertigo came on suddenly, several days after the removal of a plug of wax from the ear, with slight deafness in the affected ear; *Mt* retracted; catarrh of the Eustachian tube; staggering gait. Suggested inflation of the middle ear, following which the patient recovered.

Dr. GRUENING asked as to whether it was a case of Eustachian plugging or obstruction. Dr. BACON—Not very markedly obstructed.

Dr. DENCH thought it to be a very nice point to determine whether the tube was in a patent condition. Perfect inflation of the middle ear at any one time does not prove that the tube is normal. The calibre of the tube may often appear to be reduced by vaso-motor paresis, in neurotic patients, although no organic lesion is present. The diagnosis between disease of the middle and internal ear should be made by means of a functional examination.

Dr. SHEPPARD spoke of a patient who complained of the occurrence of **explosive noises in the ear**, when going to sleep.

Dr. DENCH thought that the noise might be due either to a sudden separation of the walls of the Eustachian tube or to a choreic contraction of the tensor tympani muscle. Dr. SHEPPARD did not think that the former could be the case. It might be due to the tensor tympani.

Dr. EMERSON : Does a change in posture have any influence?

Dr. SHEPPARD : It does not.

Dr. FRIDENBERG related the history of a **case of erysipelas of the ear following Asch's operation on the nose**.

Dr. GRUENING described a **case of erysipelas extending over the mastoid from a furuncle on the scalp**.

Dr. BERENS : reported a **case of mastoiditis ; operation followed twenty-four hours later by facial erysipelas**.

Dr. GRUENING reported a case in which, following the removal of a nasal polypus, ear trouble developed. The strepto-

coccus was found first in the nose, then in the ear. **Mastoiditis** necessitated operation, and on the third day after, **erysipelas** of the face appeared.

Dr. J. L. ADAMS reported a similar case.

Dr. DENCH had seen three similar cases, none fatal.

Dr. TOEPLITZ also.

Dr. BACON thought that it was the usual experience to have these cases recover.

Dr. KNAPP reported a **case of erysipelas** following the mastoid operation, **with loss of hair** over the erysipelatous area. No syphilitic history.

Dr. HEPBURN thought that this was not an unusual experience.

Drs. GRUENING, KNAPP, and BACON had not observed this symptom before.

Dr. ALDERTON presented two **specimens**. The first showed *deficient development of the external canal walls*, the anterior wall being almost totally absent, the superior and inferior walls being partially absent, and the posterior being very badly developed, and in one place showing a dehiscence opening into the mastoid cells. The second specimen showed *hyperostosis of all the ossicles*, to the extent of double or treble their normal size and thickness; this hyperostosis was uniform throughout.

REPORT OF THE PROGRESS IN OTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1898.

ARRANGED BY DR. A. HARTMANN.

Translated by Dr. ARNOLD H. KNAPP.

ANATOMY OF THE EAR.

268. GIANNI, G. Anatomical contribution to the study of the striæ acousticæ in man. *Arch. ital. di Otológ.*, vol. vi., p. 389.

268. GIANNI examined histologically the striæ acousticæ in a tumor which involved the region of the striæ. During life paralysis of the sixth, seventh, sensory branch of the fifth and the eighth were present. At autopsy a purulent meningitis at the base and a tubercle in the fourth ventricle were found. Gianni concludes that the greater number of the acoustic striæ decussate with those of the opposite side. GRADENIGO.

PHYSIOLOGY OF THE EAR.

269. NAGEL and SAMSJLOFF. Some experiments on the transmission of sound vibrations to the middle ear. *Arch. f. Anat. u. Physiol.*, Nos. 5 and 6, 1898, p. 515.

270. LUCAE, A. Historical note on the mechanism of the drum membrane and the ossicles. *Arch. f. Ohrenheilkunde.*, vol. xlv., p. 300.

269. The authors placed the middle ear of a fresh animal's head (ox) as a gaseous chamber in communication with a König's sensitive flame. The drum membrane was then put in motion and the reaction of the gas flame was watched in the rotating mirror. The gas was admitted by the Eustachian tube, and passed off through a perforation at the base of the skull. The vowel

curves were easily demonstrable. A tuning-fork held at the auditory canal caused the drum membrane and the flame to vibrate. The reaction of the flame was intensified if the outer opening of the meatus was closed. By interfering with the vibrations of the drum membrane through pouring in of mercury, the cranio-tympanic reaction shown in the preceding experiment was absent.

ASCHER.

270. Hermann Meyer demonstrated the mechanism of the sound-conveying apparatus and especially the axial band in his text-book in 1856, in other words long before Helmholtz.

BLOCH.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

271. NEW YORK EYE AND EAR INFIRMARY.—78th Annual Report for the year ending September 30, 1898. Aural Surgeons: Bacon, Dench, Adams, Whiting, McKernon, McAuliffe.

272. OPHTHALMIC AND AURAL INSTITUTE.—29th Annual Report for the year ending September 30th, 1898. Surgeons: H. and A. Knapp, Toeplitz, Coburn, Guttman, and Lynch.

273. MÜLLER, R. Report of Prof. Trautmann's Ear Clinic, for the year from April 1, 1897, to March 30, 1898. *Charité Annalen*, 23d year.

274. PASSOW. Examination of ear diseases after accidents. *Monatschrift für Unfallheilkunde*, 1898.

275. MÜLLER, R. The diagnosis of traumatic affections of the internal ear. *Charité Annalen*, 23d year.

271. Number of new patients, 7251; operations, 1116; removal of granulations and polypi, 113; paracentesis of membrana tympani, 369; ossiculectomy, 35; opening of mastoid cells, 138; Stacke operation, 6; removal of adenoids, 194; operation for thrombosis of sigmoid sinus, 6; operation for thrombosis of internal jugular vein, 3; operation for epidural abscess, 16; operation for subdural abscess, 3; of 9 cases of sinus thrombosis, 7 recovered; of 19 cases of epidural and subdural abscesses, 15 recovered.

GORHAM BACON.

272. Number of new ear cases, 1375; nose and throat cases, 1338; number of operations, 430; paracentesis of membrana tympani, 45; removal of granulations, 39; opening of mastoid cells, 22; incision of furuncle of external meatus, 35; ossiculectomy, 4; operation for thrombosis of sigmoid sinus, 1 (recovered); removal of adenoids, 109.

GORHAM BACON.

273. 196 in-patients were treated in the CHARITÉ EAR CLINIC, for 1897; 469 patients received treatment in the dispensary; 67 radical operations were performed; 12 remained in treatment from the preceding year. One of the reported fatal cases deserves especial mention. In a child, the mastoid was opened on account of a periosteal abscess. An hour after operation patient was taken back to his home. Death occurred seven hours later possibly from aspiration of the vomitus. This case furnishes another warning against performing larger operations on the temporal bone unless patients remain at the clinic. Cholesteatoma was found in 16% of the operative cases, a rather low percentage (Manasse and Wintermantel found 48%).

The present ward for ear patients contains thirty patients; unfortunately in the plans for the new Charité this number will be reduced. PASSOW.

275. MÜLLER gives a review of the general symptoms which enter into the diagnosis of the traumatic affections of the internal ear, and their significance in the written opinion of labyrinthine concussion. It is necessary to ascertain whether the four chief symptoms, diminished hearing, headache, vertigo, and subjective noises, are really present and if they are in any way connected with the accident. To form any opinion, the patient must be under observation for some time at a clinic. PASSOW.

b.—METHODS OF EXAMINATION AND TREATMENT.

276. LANNOIS et TOUNIER. Aural lesions are a frequent determining cause for agorophobia. *Ann. des mal. de l'or., du lar.*, No. 10.

277. COMBY. Poisoning of a child with carbolic acid. *Soc. m. des Hôpitaux de Paris*, 1898.

278. AMBLER, C. P. The pneumatic cabinet as a means of inflating the middle ear. With remarks as to the advantages and disadvantages of the various methods employed. *The Laryngoscope*, Oct., 1898.

279. MILLENER, F. H. The use of nosophen and antinosine in purulent disease of the middle ear. *Buffalo Med. Jour.*, Dec., 1898.

280. BONNIER. Paracusis based on a particular form of Weber's test. *Arch. int. de lar., d'ot.*, xi., p. 6.

281. GRUNERT. On Kirchner's results on poisoning with

salicyclic acid and quinine. *Arch. f. Ohrenheilk.*, vol. xlv., p. 161.

282. CONNAL. A case of myxœdema with deafness and tinnitus in a man, thirty-six years old. *Glasgow Med. Four.*, Oct., 1898.

283. HEERMANN. Relation of certain ear diseases to general pathology. *Deutsche med. Wochenschr.*, 1898, No. 49.

284. ROSATI, T. Bullet wounds of the ear. *Arch. ital. di otologia*, vol. vii., p. 55.

285. GERONZI, A. Ocular disturbance in ear disease. *Arch. ital. di otologia*, vol. vii., p. 331.

286. COURTADE. Aural speculum to measure the inclination of the hammer. *Arch. int. de lar., d'ot.*, xi., p. 6.

287. DE SIMONI, A. Intratympanic injections in the treatment of chronic middle-ear catarrh. *Arch. ital. di otologia*, vol. vii., p. 81.

288. WARNECKE. Air rarefaction in the meatus combined with catheterization. *Arch. f. Ohrenheilk.*, vol. xlv., p. 251.

289. SCHLEICHER. The vibratory massage of the drum membrane. *Arch. int. de lar., d'ot.*, xi., p. 5.

290. HUMMEL. The functional examination of the ear by the medical practitioner. *Deutsche militärärzt. Zeitung*, 1898, p. 515.

291. WARNECKE. A functional examination to detect simulation. *Arch. f. Ohrenheilk.*, vol. xlv., p. 265.

292. URBANTSCHITSCH. The value of methodical hearing exercises for deaf-mutes. *Wiener klin. Wochenschr.*, No. 50, 1898.

293. HALASZ. Hydrogen peroxide in rhinology and otology. *Wiener klin. Wochenschr.*, No. 50, 1898.

294. ZAALBERG. A cutting ear-forceps. *Monatschr. f. Ohrenheilk.*, No. 10, 1898.

295. KUGEL. A new hearing apparatus for the deaf. *Wiener med. Wochenschr.*, No. 46, 1898.

276. Ten cases are reported to show that agorophobia may be caused or kept up in nervously disposed persons by ear disease with vertigo or subjective noises. Several of the cases are confirmatory, for with improvement in the aural condition a disappearance of the agorophobia was noticed; others are less so, as the ear lesion resisted treatment. ZIMMERMANN.

277. A child had had its ear irrigated for ten days with

carbolic-acid solution, 15 to 1000, and carbolized glycerine was instilled. Hæmaturia set in. Recovery after cessation of the carbolic-acid treatment.

278. AMBLER finds that the pneumatic cabinet possesses advantages over the Valsalvian and Politzer methods of inflation, and the only objection to its use is the cost of the cabinet and the room it takes up in an office.

GORHAM BACON.

279. MILLENER has used these remedies in thirty-six cases, twenty of them being cases of acute otitis media purulenta, and sixteen chronic otitis media purulenta. Many of these cases, however, had adenoids and enlarged tonsils, which were excised. He considers these drugs to be superior to those in general use for this condition.

GORHAM BACON.

280. This remarkable discovery which BONNIER calls *paracusis Weber*, is that the sound of the tuning-fork is lateralized to the diseased ear when the fork is placed on a bone distant from the ear,—olecranon, knee, or ankle. The tone on the other hand is not lateralized if the fork is placed, as in the usual *Weber*, on the vertex. Diseases of the sound-conveying apparatus may thus be recognized when ordinarily after the negativeness of *Weber's* experiment a lesion of the sound-perceiving apparatus was supposed. This test is also prognostically of importance. Bonnier does not state the number or the kind of patients observed.

ZIMMERMANN.

281. GRUNERT asphixiated white mice and doves, and examined histologically their labyrinths and middle-ear structures to see whether *Kirchner's* findings could be accounted for by suffocation. He found hyperæmia and blood-extravasates, but to a less extent and not at the same places as *Kirchner*. Grunert believes, therefore, the hemorrhages in the cochlear duct observed by *Kirchner* to be the result of the medicines employed.

BLOCH.

282. CONNAL noticed that the mucous membrane covering the inf. turbinated bones was greatly swollen and lying against the septum, and that the uvula was elongated and wrinkled. Under thyroid tabloids this swelling went down, and the hearing and tinnitus quite disappeared.

283. HEERMANN gives five complete histories of patients afflicted with various degrees of middle-ear catarrh and with sclerosis. All of the patients suffered from disturbances of digestion and circulation, and symptoms referable, according to the

author, to beginning arterio-sclerosis. Treatment of the general condition in addition to that of the local trouble produced marked and persistent improvement. He believes that treatment with thyroid extract, as proposed by Vulpian, is justifiable in cases where the general conditions seem to call for this treatment, though he acknowledges the fairness and failures of Bruck's experiments.

NOLTENIUS.

284. From eight personal observations and experiments on the cadaver, ROSATI concludes that revolver bullets can enter the skull with difficulty, owing to the resistance of the bone. The extraction of the bullet is difficult because of the uncertainty of its position, the chance of its altered shape, and the severity of the injury. Hearing is more or less severely impaired.

GRADENIGO.

285. In an otitis following influenza an abducent paralysis set in after a few days, which disappeared in a short time.

GRADENIGO.

286. COURTADE has devised a speculum marked in degrees, and with a vertical plumb line to read off the angle at which the handle of the malleus deviates from the vertical. He has found this instrument of value, especially in young people, as a gauge for the success of his treatment.

ZIMMERMANN.

287. In certain cases DE SIMONI obtained good results by injecting vaseline-oil and iodoform-ether through the Eustachian tube.

GRADENIGO.

288. This is an arrangement by which the air in the meatus is rarified to a measurable degree, and at the same time catheterization takes place. The combined action is more potent than either alone. Cases of chronic catarrh, etc., are said to be improved.

BLOCH.

289. SCHLEICHER does not see any advantage in the vibratory apparatus driven by a motor over the old methods. The rapidity of the concussions is not so essential as the regularity, and the extent of the movement.

ZIMMERMANN.

290. The author reviews the various methods of conducting the functional examinations and gives his own method where the condition of the drum membrane is negative, which is as follows : 1. Examination of both ears with whispering voice. 2. The length of perception for bone-conduction (Schwabach) with *a'* and *A* placed on the vertex. 3. Rinne's test with *a'*, noting the difference in seconds between bone- and air-conduction. 4. Perception of

deep tones in air-conduction with C_1 . 5. The same with the Galton whistle for high tones, remembering that in sclerosis these tones are often heard only in gaps. 6. In one-sided deafness, Weber's test. Then follows the use of catheter, etc. BRANDT.

291. An excellent method for the proper case. Two examiners stand, one as far away as possible, the other next to the patient. The nearer one begins to whisper, which the distant one continues directly in the same tone of voice; or the distant one whispers while the near one is silent or blows gently against the ear of the patient as if whispering. BLOCH.

292. URBANTSCHITSCH shows that Gutzmann's poor results with hearing exercises in deaf mutes were due to a faultily applied method. With this same method the hearing in Vienna had been improved. POLLAK.

293. HALASZ employs hydrogen peroxide in ac. and chr. otitis, and as a hemostatic in the ear and the nose. POLLAK.

294. GRÜNWALD'S nasal forceps modified for the ear.

EXTERNAL EAR.

296. WARNECKE. Varicocities of pregnancy in the external meatus, the auricle, and surrounding parts. *Arch. f. Ohrenhkl.*, vol. xlv., p. 267.

297. VILLA. Fibroma of the lobule after repeated introduction of an earring. *Archiv. ital. di Otol.*, vol. vii., p. 154.

298. DE SIMONI. The artificial closure of perforations in the membrana tympani. *Archiv. ital. di Otol.*, vol. vii., p. 156.

296. The dilated veins had developed in the course of 4 pregnancies, and surrounded the auricle extending to the hair, and were present on the auricle and in the canal. The drum membrane remained free. They reached their full development at the end of the third month and diminished after birth. Occasionally there were hemorrhages. Organs of the neck and chest were normal. BLOCK.

297. Two small fibromatous tumors in the lobule at the perforation for the earring. GRADENIGO.

298. Closure with the application of trichloroacetic acid took place 11 times in 14 cases. GRADENIGO.

MIDDLE EAR.

a.—ACUTE OTITIS.

299. POWER, D'ARCY. Otitis media followed by mastoid abscess in an infant aged five weeks. Operation. Recovery. *British Med. Journal*, Nov. 19, 1898.

300. LARSEN, S. C. Remarks on the treatment of acute purulent otitis. *Arch. f. Ohrenheilk.*, vol. xlv., p. 285.

301. MENIÈRE. A case of Bezold's mastoiditis. *Arch. internat. de lar. d'Otol.*, etc., vol. xi., p. 5.

299. A female infant aged five weeks was brought to D'Arcy Power on June 16, 1898. Discharge from left ear two weeks. Swelling behind ear two days. Temperature 100°. On incising a small track found leading into antrum which was opened and found full of granulation tissue. Recovery. CHEATLE.

300. From an observation of 60 patients at the Copenhagen Military Hospital it seemed that the length of disease up to cure was uninfluenced whether the patients remained in bed during the entire sickness or not. The cases treated dry healed very much quicker than where instillations (sublimat 0.005, cocaine 0.20, aqu. 10.0) were introduced. There was no fœtor in those treated by the dry method, and among the 8 which developed granulations there was only one of these. The 4 cases with complicating mastoiditis had all received instillations. The dry packing was performed with sterilized pledgets of cotton.

BLOCH.

b.—CHRONIC PURULENT OTITIS.

302. CHEATLE, A. H. Operative interference on the drum and ossicles in chronic middle-ear suppuration. A comparative study. *The Practitioner*, October, p. 362, 1898.

303. WHITE, FAULDER. Suppurative Otitis Media Complicated by Hyperplasia of the Meatus. *Lancet*, Dec. 24, 1898.

304. WHITE, F. FAULDER. Exfoliation of cochlea. *Lancet*, Dec. 17, 1898.

305. HILL, WM. Paresis of right facial nerve and of the right side of the palate following tympanic suppuration. *Proceedings of the Laryngological Society of London*, Nov. 4, 1898.

306. GOLDSTEIN, M. A. The modern therapy of suppurative otitis media. *The Laryngoscope*, Dec., 1898.

307. AVOLEDO. Ankylosis of the jaw after purulent otitis. *Arch. ital. di Otologia*, vol. vii., p. 65.

308. LUBET-BARBOX. A case of enormous cholesteatoma of the temporal bone. *Arch. intern. de lar. d'ot.*, xi., p. 6.

309. JANSEN, A. A frequent involvement of the labyrinth in the purulent otitides. *Arch. f. Ohrenhilk.*, vol. xlv., p. 193.

310. DREYFUSS. Middle-ear tuberculosis with special consideration of its termination in healing. *Inaug. Dissertation*, Bâle, 1898, 104 p.

311. ZAALBERG. Aristol in otology. *Monatsch. f. Ohrenhkl.*, No. 12, 1898.

312. ZERONI. A study of the healing process after the operative exposure of the middle-ear spaces. *Arch. f. Ohrenhkl.*, vol. xlv., p. 171.

313. REINHARD. Thiersch's transplantation after trephining the mastoid. *Arch. f. Ohrenhkl.*, vol. xlv., p. 186.

314. V. MOSETIG-MOORHOF. Plastic closure of the bony defect in the mastoid process by means of a folded skin flap. *Centralblatt f. Chirurgie*, No. 46, 1898.

302. CHEATLE has collected the views of some of the leading aural surgeons of the world on this procedure and in conclusion briefly reviews the entire question as follows: The operation is undertaken (*a*) to remove the cause of the discharge and (*b*) to improve the hearing after the discharge has ceased.

(*a*) To remove the cause of the discharge. Indicated when ordinary treatment has been unsuccessful and there are no signs or symptoms of extension. These cases may be divided into groups according to the site of the perforation. 1. If in Shrapnell's membrane, the indication is important, as chronic disease in the attic with its attendant dangers is generally present. Improvement in hearing is frequently obtained. If a cure is not effected the radical post-aural operation is demanded. 2. If the perforation is situated in the posterior-superior quadrant the incus is usually carious and the attic may become secondarily affected. 3. Perforation in other parts of the drum can usually be successfully treated with lesser surgical procedures than the removal of the ossicles.

(*b*) To improve hearing after the discharge has ceased. Implication of the labyrinth must be excluded. Cases requiring this intervention may be divided into groups according to the presence of, 1, solution of ossicular continuity; 2, adhesions; 3, flaccid cicatrices; 4, retained epithelial deposits, etc., behind the drum. 1. In this group generally the malleo-incudal articulation is functionless through disease of the incus. To test the conducting power of the drum and ossicle it is advisable to gently stroke the drum with a fine probe or a brush, etc. 2. Adhesions may be superficial or deep, or both. If improvement does not occur after

removal of drum, malleus, and incus, the deeper adhesions about the stapes, round and oval windows, should be dealt with. An adhesion frequently seen passes down from above to the head of the stapes. The question of the removal of the stapes requires further investigation. Improvement has followed section of the adhesions occluding the *round* window. 3. A flaccid cicatrix may be benefited by multiple incisions, but adhesions are usually present. 4. Retained matter behind the membrane usually requires only incision, though removal of the drum and malleus may be necessary. A. H. K.

303. A man, aged forty, who had suffered with discharge from the left ear for six or seven years, came to FAULDER WHITE, in July last, with cessation of discharge and pain in the left side of head. The meatus was found to be blocked by a firm sessile fibro-cartilaginous growth on the posterior meatal wall. The growth was removed with the knife and scissors, allowing a large amount of pent-up pus to escape. Recovery. CH.

304. A woman, aged twenty-eight years, had suffered with discharge from the right ear since childhood. In September, 1897, she had a severe illness, was delirious and sick with pain in the ear and side of head. She came under FAULDER WHITE's care in October, 1898. While removing some polypi from the middle ear, a sequestrum, consisting of the modiolus and part of the osseous spiral lamina, came away.

305. In addition to the right facial paresis, there was marked asymmetry of the palate, the arch being much higher on the left side ; the right was flaccid, the uvula being adherent on that side. CH.

307. Anchylosis of the jaw after purulent otitis is the result of extension of the suppuration through the fissure of the malleo-maxillary ligament. GRADENIGO.

308. The symptoms of the cholesteatoma were otorrhœa of six months' duration, and occasional headache ; the ear had been deaf since childhood. At the operation it was found that the temporal bone consisted of a cavity as large as a hen's egg surrounded by a soft shell. The bone had disappeared underneath the periosteum, the dura, and the sinus. ZIMMERMANN.

309. This paper has been reported under the heading of Congress of German Scientists at Frankfort, 1896. BLOCH.

310. DREYFUSS gives a complete description of middle-ear tuberculosis from the historical, pathological, and clinical aspect.

He describes three characteristic groups of this disease. 1. The so-called scrophulosis, with abscesses and fistulæ about the mastoid, usually in children; prognosis good. 2. The incurable progressive form in florid consumptives. 3. The stationary form of which every chronic otorrhœa is suspicious, which, where no evidence of cholesteatoma is present, resists rational treatment. The basis of the paper are seven histories of healed middle-ear tuberculosis from Liebermann's cases. BOENNINGHAUS.

311. ZAALBERG recommends aristol in the after treatment of the radical operation. KILLIAN.

312. ZERONI gives the histological examination of two temporal bones which were examined six weeks and one year after an operation for cholesteatoma had been performed. Cysts were found beneath the new-formed epidermis of the tympanum, in one case, communicating with the Eustachian tube. These cysts, Zeroni thinks, may account for the retarded healing. BLOCH.

313. REINHARD, who is not in favor of the regular primary closure of the retro-auricular wound, recommends Thiersch's transplantation for rapid epidermisation. BLOCH.

c.—COMPLICATIONS OF PURULENT OTITIS.

315. TILLEY, HERBERT. Case of abscess of temporo-sphenoidal lobe. Operation. Recovery. Remarks. *The Laryngoscope*, December, 1898.

316. HAMMOND, PHILIP. A case of necrosis of the mastoid with septicæmia and gangrene of the lung: operation: recovery. *Boston Med. and Surg. Journal*, Dec., 22, 1898.

317. WOODS, HIRAM, Jr. Cases of mastoid disease. *Maryland Medical Journal*, Dec. 22, 1898.

318. GRADENIGO. On the value of the ophthalmoscopic examination in intracranial complications, etc. *Ann. des mal. de l'or. du lar.*, No. 12, 1898.

319. MEIER. A contribution on the pathology and therapeusis of otitic brain abscess. Jubilee publication of the Magdeburg Medical Society, 1898.

320. HEINE. A case of brain abscess. *Arch. f. Ohrenhilk.*, vol. xlv., p. 269.

321. POLI, C. Intracranial otitic complications. *Arch. ital. di Otologia*, vol. vii., p. 1.

322. HOFFMANN. A case of healed brain abscess. *Deutsche med. Wochenschr.*, No. 49, 1898.

323. MÜLLER. An otitic cerebellar abscess cured by operation. *Deutsche med. Wochenschr.*, No. 49, 1898.

324. GRADENIGO. Important semiologic peculiarities in otitic thrombosis of the lateral sinus. *Arch. ital. di Otologia*, etc., vol. vii., p. 84.

325. SCHMIDT. A case of otitic pyæmia. *Deutsche med. Wochenschr.*, No. 46, 1898.

315. The case reported was that of a child, nine years of age, who had a chronic suppurative otitis media of the left ear. When six years of age she had mastoid disease on the same (left) side and an operation was performed. She was apparently cured but the discharge never ceased. Recently she complained of severe earache with scanty discharge. Both pupils very widely dilated. Temperature, 98.6° F.; pulse, 70. The patient became extremely irritable, with a pulse of 54. Operation; antrum found filled with greenish, offensive pus; tympanic roof gone, and an opening extended through the dura into the brain substance. The patient recovered.

GORHAM BACON.

316. The case reported was that of a boy, sixteen years of age, who had had a chronic otorrhœa followed by inflammation of the mastoid cells. There were chills, followed by fever, nausea, and vomiting, with dizziness. The mastoid cells were almost entirely destroyed and filled with foul-smelling pus. The sinus was injured during the operation. As free hemorrhage occurred, the operation was suspended. There were however more chills and symptoms of blood-poisoning, so that the dressings were removed the third day after the operation. Tenderness along the neck developed and a swelling made its appearance beneath the mastoid tip. The antrum was thoroughly curetted. The sinus was found soft and apparently contained no clot. The abscess in the neck was opened and a counter opening made in the neck. Somewhat later a cough manifested itself due to gangrene of the lung. The boy made a good recovery.

GORHAM BACON.

317. Woods reports a case of primary periostitis of the mastoid cortex in a girl, twenty-four years of age, who complained of earache for one week. The hearing was normal and there were no evidences of middle-ear disease. The patient recovered. Second case: acute suppurative otitis media. Supra-cortical collection of pus (dissecting tympano-mastoid abscess). The child, three years of age, had an acute suppurative inflammation of the left ear. There was a small perforation in the upper and

posterior angle of the drumhead. Otorrhœa profuse. This was followed by a large post-auricular swelling and the superior canal wall was swollen. An incision was made in the abscess cavity behind the auricle but the cortex was not opened. Recovery followed.

GORHAM BACON.

318. GRADENIGO has collected 635 cases (including 74 of his own) where an ophthalmoscopic condition was present in 172, in which a papillitis was present in one half the cases. Even in extracranial abscesses fundus changes were noted in 41 per cent., as opposed to Grunert's statement. The diagnosis of an intracranial complication is assured by the presence of a fundus change, as a papillitis occurs so rarely in a simple otitis or mastoiditis that it can be disregarded. It however, does not affect the prognosis, for a papillitis may be present in a mild case, and be wanting in the severe one.

ZIMMERMANN.

319. MEIER reports the four following cases :

1. Man aged forty-one, bilateral acute purulent otitis and inflammation of the labyrinth following erysipelas ; on seventeenth day of illness, mydriasis right, then vomiting, rigidity of neck, headache, fever with slow pulse, tenderness on percussing the skull, especially on right side, but no mastoid tenderness. At operation fetid pus in mastoid (not in middle ear). Caries of tegmen tympani. Exposure of discolored dura, pia. Evacuation of pus from puncture of temporal lobe. Death on following day. Autopsy revealed labyrinth filled with pus, meningitis transmitted by int. auditory meatus ; in middle of lower temporal lobe a cavity the size of a walnut.

2. Girl, eight years old, right o. m. p. c. cholesteatoma, rigidity of neck, stupor, swollen cord along sterno-mastoid. Lumbar puncture revealed clear fluid. Evening temperature 39.8, morning 37.3. *Operation* : A cavity with purulent contents in mastoid, connecting with extradural space. Cerebellum softened, diffuse purulent encephalitis. Transverse sinus and jugular vein thrombosed to thyroid vein. Ligature of int. jugular above clavicle, resecting a portion 8 cm long. Streptococci were grown from the lumbar puncture fluid. Death four days later. *Autopsy* : Sequelstrum of cochlea surrounded by granulations. Meningitis.

3. Boy, sixteen years old : left chronic purulent otitis, vertigo, headache. *Operation* : Caries of roof of tympanum and antrum ; evacuation of temporal lobe abscess from the base. In good condition until the seventh day, when collapse, pain, total deafness

on the opposite side with clear cerebation set in. After puncture and evacuation of pus from the temporal lobe improvement also of the hearing. Five days the same picture as before puncture. Counter opening at squama. Fluid from lumbar puncture is clear. Death on following day. *Autopsy*: No meningitis. Cause of death: Variation in pressure caused by traction of the cavity on the surrounding parts of the brain.

4. Man, thirty-nine years old, right o. m. p. c. cholesteatoma. *Operation*: Caries of roof of tympanum. Infiltrated dura. No brain pulsation. Pus after incision. Further course normal except removal of granulation at horizontal semicircular canal. After three weeks ear dry. Healing permanent.

The author emphasizes importance of early operation, the value of lumbar puncture, the way of infection from the ear, and believes that the cerebral complication must be sought from the ear.

BRÜHL.

320. Three cases of left-sided abscess in the temporal lobe operated on in 1897 at Lucae's clinic and healed.

1. Woman, twenty-four years old, double otorrhœa since childhood, admitted in stupor. Left mastoid tender, swollen, fetid discharge, granulations, papillitis, retarded pulse. An abscess in the left temporal lobe was diagnosticated. *Operation*: Cholesteatoma and empyema of the left mastoid, sinus intact, tegmen antri greenish, was removed, fetid pus appeared from a fistula in dura, the latter was then freely exposed. Incision in temporal lobe evacuates two teaspoonfuls of thin pus. Drainage-tube gauze tamponade. On recovering consciousness after operation, patient presented amnesic aphasia.

2. Man, twenty-one years old, left otorrhœa since childhood. In 1897, sudden bilateral loss of sight, left meatus filled with a polyp. Both pupils wide and irresponsive, optic neuritis with atrophy. Left ptosis. Radical operation; fetid cholesteatoma of mastoid and tympanum, no fistula at tegmen to be found. On following day a fistula is found in tegmen aditus and from this a second in the dura which evacuated one fourth litre pus under heavy pressure. Healing after three months; later patient became affected with paranoia.

3. Boy, thirteen years old, double otorrhœa since childhood. In 1893 was operated on for cholesteatoma on right side. Toward end of 1897 l. headache, vertigo, vomiting, chills, fever. Cholesteatoma of antrum and attic. Dura of temporal lobe partly ex-

posed, granulating. Sinus free. One week later amnesic aphasia, papillitis; temporal lobe abscess opened. Six hours after operation the aphasia has passed off. Healed in six months.

BLOCH.

322. After remarking on the great difficulties connected with the differential diagnosis of intracranial complications (extradural abscess, sinus phlebitis, meningitis, brain abscess), HOFFMANN reports a successful case of brain abscess in the temporal lobe, which had caused paralysis of the left arm and left leg, stupor, and pulse reduced to 44 beats in the minute. A cup of fetid pus was evacuated, and a few hours later consciousness returned, and the paralysis disappeared. The abscess cavity did not heal for ten weeks, and otorrhœa ceased after five months. Patient is perfectly well.

NOLTENIUS.

323. Man, twenty-three years of age, with long-standing left otorrhœa. At the radical operation the bone was found unusually hard, though no signs of any intracranial complications were found. Immediately after the operation fever set in. The author believes that the fever was caused by the setting free, with the blows of the chisel, of septic material, which was present in the sinus or cerebellar abscess, as the wound healed smoothly. The signs of a brain abscess (chills, fever, tenderness on percussion, vertigo, stupor, papillitis, slowed pulse) became more marked, and in the absence of aphasia, and paralysis of the extremities, MÜLLER made the probable diagnosis of cerebellar abscess. Ten weeks after the operation, a trephine opening was made with the rotating saw, half-way between the occipital protuberance and the mastoid process. A knife was put in the cerebellum, but without result; a dressing forceps was then introduced, and a teaspoon of pus evacuated. Patient recovered, and was healed after three months.

Müller recommends this site for seeking a cerebellar abscess rather than proceeding back from the mastoid wound and risking the danger of wounding the sinus. The opening should be small (3 by 1.5 *cm*), and does not require the carrying of a protecting cap. The author objects to introducing the finger in the abscess cavity, and recommends the use of the dressing forceps.

NOLTENIUS.

324. GRADENIGO reports the case of a man, thirty-two years old, where the autopsy revealed gangrene of the lung, and a septic thrombosis of the sinus, though the latter contained circulating

blood at time of operation. During the first days of treatment, the exposed sinus did not pulsate when the patient was on his back, but when the head was raised extensive pulsation became evident, as if the blood passed in large waves, perhaps on account of the partial patency of the lumen. GRADENIGO.

325. SCHMIDT reports eight cases of otitic pyæmia, of which six were not operated upon. The first died without operation or autopsy. The symptoms pointed to the perforation of the epidural abscess into the skull, and fatal carotid hemorrhage. The second and third recovered without operation. In the latter from the symptoms a central pneumonia cannot be excluded, though Schmidt believes that a phlebitis of the transverse sinus existed, with embolus in the lung. The fourth patient was operated on (a solid thrombus in sinus, heavy hemorrhage on its removal); death in forty-eight hours. No autopsy. Death supposed from pyæmic intoxication, without pronounced meningitis, possibly meningitis serosa. In the fifth case a solid thrombus was present, removed without hemorrhage. Death three days later. Post mortem showed hyperæmia with œdema of brain. Incipient meningitis. Schmidt regards this also a serous meningitis. The remaining three cases recovered after operation. Case 6: The transverse sinus contained fluid blood, pyæmia continued for seven days after operation, and the pyæmic focus probably was situated in the bulb of the jugular vein. Case 7: No pus in antrum. Puncture of sinus, fluid blood there, trephining after v. Bergmann; also without avail. The tip of the mastoid was then removed; it contained a small sequestrum, and some muco-pus. The focus of the pyæmia was not found, as the chills, etc., continued for thirty days. Case 8: Antrum empty, the sinus does not pulsate, its wall is discolored, and contains a solid thrombus, with signs of breaking down. During the after treatment profuse suppuration from the bulb, and later transient facial paresis.

The author is a partisan of the Stacke operation, and is opposed to the generalization of v. Bergmann's procedure in cranial complications after otitis to open the skull primarily over the tegmen tympani and from there to enter the middle ear. On this point most otologists probably agree with him. NOLTENIUS.

d.—OTHER DISEASES OF THE MIDDLE EAR.

326. CONNALL, J. G. Rupture of the tympanic membrane with clonic spasm of the facial muscles in a diver. *British Medical Journal*, September 10, 1898.

327. TRAUTMANN, G. A case of foreign body in the Eustachian tube. *Münch. med. Wochenschr.*, No. 47, 1898.

328. HEIMANN, T. On progressive deafness. *Wiener klin. Rundschau.*, Nos. 48-52, 1898.

329. HARTMANN, E. Bony ankylosis of the stapes in the oval window, with report of four new cases. *Inaug. Diss.*, Bâle, 1898.

330. FARACI, G. Results after mobilizing the stapes. *Arch. ital. di Otolg.*, etc., vol. vii., p. 129.

331. FARACI, G. A new way to mobilize the stapes. *Ibid.*, p. 313.

326. A diver was knocked off the ladder as he was descending and fell to the bed of the river. A severe pain was immediately felt in the right ear and all over the side of the face. Inflammatory middle-ear symptoms then supervened. About twelve hours after the accident, violent, painful, spasmodic contraction of all the right facial muscles occurring every few seconds came on. This condition was immediately arrested on politzerisation.

ARTHUR CHEATLE.

327. Otorrhœa for one year. Burning sensation in the neck. Eustachian orifice swollen. In lower anterior quadrant of drum membrane, oval perforation. Syringing the ear canal evacuated a cherry pit into the pharynx; the opening of the Eustachian tube then appeared gaping.

SCHEIBE.

330. The results of mobilizing the stapes as regards hearing were satisfactory in four of eight patients and poor in the remainder. Disturbances of equilibrium were more affected than the subjective noises.

GRADENIGO.

331. With the bone forceps a segment of the tympanic sulcus is resected from the meatus to expose the stapes. Bands and fibrous adhesions in the niche of the oval window are then divided. No mention of final results.

GRADENIGO.

NERVOUS APPARATUS.

332. FINLAYSON, JAMES. The diagnosis during life of retinal and labyrinthine hemorrhages in a case of splenic leukæmia. *British Medical Journal*, December 31, 1898.

333. LERNER. On tabic deafness. *Monatschrift f. Ohrenheilk.*, No. 10, 1898.

334. SMITH, G. C. Menière's disease. *Boston Med. and Surg. Journ.*, November 24, 1898.

332. A woman aged twenty-nine, suffering with leukæmia, became very deaf in both ears after an attack of severe giddiness and nausea. Barr, who examined the case for the aural trouble diagnosed "exudation in the cavities of the labyrinth, probably hemorrhagic in character." After death examination of the internal ear showed hemorrhages in the vestibule and first turn of the cochlea, the middle ears being normal. CH.

333. After reviewing the literature LERNER gives a detailed account of a case of sudden, bilateral total deafness in tabes, where a careful examination lead to the diagnosis of a tabic disease of the auditory nerves. KILLIAN.

334. The patient, a man, sixty-two years of age, of fairly good health, while sitting one evening in conversation, suddenly felt as though he was seized by some power and hurled a considerable distance, striking against the left side. He was unconscious for the moment but arose with assistance. He was unable to walk on account of vertigo and had to lie down. This was followed by vomiting and vertigo, which continued all night. There was also a hissing tinnitus and on the following day there was deafness in the left ear. He was treated at first for biliousness and had no further trouble for five weeks, when he had a similar, but milder, attack. He was also treated by the Salisbury method and his weight reduced thirty-eight pounds in five months. During this time he had six seizures similar to the last one. During all this time the noises in the head were continuous. The deafness, though incomplete, never improved after the first seizure.

GORHAM BACON.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

335. GROSHEINTZ. On the relation between hypsistaphylia and leptoprosopia; a contribution to the etiology of the vaulted palate. *Inaug. Dissert.*, Bâle, 1898, and *Arch. f. Laryng.*, vol. 8, No. 3.

336. MEISSER. Chamæprosopia an etiological factor in manifest ozæna. *Inaug. Dissert.*, Bâle, 1898.

335. GROSHEINTZ made accurate craniometric measurements in sixteen racial skulls with high, narrow palates, and found that hypsistaphylia coincides with leptoprosopia, i.e., with the narrow face and narrow nose. The high palate does not, as Bloch thinks, necessarily presuppose preceding or existing hypoplasia of the

pharyngeal tonsil, etc. The author's measurements do not refute or render improbable the view shared by most rhinologists that, aside from heredity, a high palate may be caused by nasal obstruction.

BOENNINGHAUS.

336. From measurements of forty patients with ozæna, MEISSER finds that congenital width of the nose is an etiological factor in ozæna, though not the only one, as only a small part of the chamæprosops ($\chi\alpha\mu\alpha\iota$ = low) are affected with ozæna. A second factor is the metaplasia of cylindrical to squamous epithelium, which is not the result of the suppuration, as previously supposed, but precedes the latter process, which is the most important result of the research. In two cases of one-sided ozæna he found the middle turbinate on the non-atrophic side, but narrowed by a deflected septum already covered with pavement epithelium.

BOENNINGHAUS.

b.—METHODS OF EXAMINATION AND TREATMENT.

337. MAYER, EMIL. On the use of Schleich's mixture in operations of the nose and throat. *N. Y. Med. Jour.*, October 15, 1898.

338. SIMPSON, W. K. The use of the Bernays' aseptic sponge in the nose and naso-pharynx. *N. Y. Med. Jour.*, October 1, 1898.

339. HANSEL. Therapeutic notes. *Weiner klin. Wochenschr.*, No. 49. 1898.

340. BREITUNG. Sterile mops for operations in the nose and throat. *Monatschr. f. Ohrenheilk.*, No. 11, 1898.

337. MAYER has used Schleich's mixture II. in twenty-one and mixture I. in forty-nine operations of the nose and throat, and has found it to give an exceedingly satisfactory anæsthesia without a stage of excitement, with increase of the tension of the pulse and rapid return of consciousness, which insures a safeguard against post-operative hemorrhage. There was vomiting in six cases. Only in one case of ethmoiditis Mayer had to substitute ether. (Rodman reports, in the *Medical Record*, October, 1898, the experience of the Schleich anæsthesia in the Mount Sinai Hospital, which was not satisfactory to the surgeon. The reviewer has used the Schleich mixture without petroleum ether, and found it excellent in operations of brief duration.)

M. TOEPLITZ.

338. The Bernays' aseptic sponge is composed of prepared

cotton fibre, subjected to many hundred pounds of pressure, in the shape of circular discs of $\frac{1}{16}$ inch in thickness, and possesses great absorptive power, by which it increases very much in size. SIMPSON considers it superior to all known materials used for controlling intranasal hemorrhage, for which it has to be cut in a semicircular form, and inserted with the convexity upward. In postnasal hemorrhage he uses the smallest size of disc with holes in either end for the reception of strings. The sponges are used also as splints in the later stage of the Ash operation, as intranasal dressing, for the prevention of adhesions, for conveying medication, and in atrophic rhinitis. They are manufactured by Johnson & Johnson. M. TOEPLITZ.

339. In Chiari's clinic orthoform proves to be a satisfactory and complete local anæsthetic in ulcerous processes in the upper air passages. Six per cent. iodvasogen was not satisfactory as an application in the nose, while two per cent. mentholvasogen produces some relief in a few cases of chr. hypertr. rhinitis, though generally was not well borne; it gave better results in chronic pharyngitis. Anesin of no value. Airol, traumatol, and xeroform were used as dusting powders and in ten per cent. gauze. Airol proved to be the strongest desiccant; as antiseptics they were equally potent but inferior to iodoform, though there is no odor and no toxicity. POLLAK.

340. Cotton wound on spirally turned glass rods was sterilized. KILLIAN.

c—OZÆNA.

341. GONGENHEIM et LOMBARD. Interstitial cupric electrolysis in ozæna. *Ann. des mal. de l'or., du lar.*, No. 11, 1898.

341. These authors employ a current of 10 milliamperes strength for 10-12 minutes; the positive needle is inserted horizontally in the middle turbinate, the negative being placed in the lower or in the septum. The results due to a stimulating trophic influence consist in the disappearance of the odor. This occurred in 7 out of 30 treated cases; the others are still partly in treatment. ZIMMERMANN.

d—NASAL SEPTUM.

341. DE BLOIS, THOMAS AMORY. Submucous operations on the nasal septum. *N. Y. Med. Journ.*, October 8, 1898.

342. CHEATLE, ARTHUR H. A case of paroxysmal sneezing associated with great hypertrophy of tissues in the neighborhood

of the septal tubercle. *Proceedings of the Laryngological Society*, Nov. 4, 1898.

344. LERMOYEZ. Syphilitic chancre of the nasal septum having a pseudo-sarcomatous type. *Ann. des mal. de l'or., du lar*, No. 12, 1898.

342. DE BLOIS found, in a case of a young woman suffering from persistent epistaxis, who had been operated upon for a spur of the septum, the mucous membrane absent over a large area of the cartilaginous septum. In treating the borders of the mucosa the denuded cartilage sloughed away until a large perforation was established. After several attempts at grafting mucous membrane taken from the throat, he finally succeeded in partially bridging over the perforation. De Blois, therefore, removes spurs by detaching at first the mucous membrane from below with long-handled dental instruments, bent and ground into knives and gouges, then cutting off the spur with the saw without severing the flap, and finally by attaching the flap with collodion. He has been successful with this method in six cases.

M. TOEPLITZ.

343. A man complained of nasal obstruction and violent attacks of sneezing. On the right side, a pink soft mass, springing from the septum opposite the middle turbinal, extending downwards and forwards, having a broad base with slightly overhanging lower edge, quite obscured the middle meatus and reached down to the inf. turbinal. The same condition existed on the left side but to a less degree.

With a cold snare the larger portion of the mass on the right side was removed. Sections showed great hypertrophy of normal tissue; numerous glands giving an almost adenomatous appearance in parts, with large blood spaces and great increase of connective tissue.

CH.

344. This swelling, occurring at the cartilaginous septum of a man aged twenty-five years, was taken for an old thickening, for an inflammatory swelling, for a hard chancre, for a purulent perichondritis, and for a sarcoma in turn. An operation with temporary resection of the nose was about to be undertaken when a typical roseola appeared. Recovery followed intramuscular injections of calomel.

ZIMMERMANN.

ε—ACCESSORY SINUSES.

345. COBB, C. Thirty cases of antral empyema. *Boston Med. and Surg. Journ.*, Dec. 1, 1898.

346. BRYAN, J. H. Further results of operative treatment of chronic frontal sinusitis. *N. Y. Med. Jour.*, Dec. 17, 1898.

347. MORRISON, J. T. J. Fracture of inner wall of orbit into anterior ethmoidal cell. *Brit. Med. Jour.*, Nov. 19, 1898.

348. CHEATLE, ARTHUR H. X-ray photograph of foreign body (silver tube) in the antrum of Highmore. *Proceedings of Laryngological Society*, Dec. 2, 1898.

349. GRANT, DUNDAS. Two cases of empyema of the antrum of Highmore cured by intranasal treatment. *Proceedings of Laryngological Society*, Dec. 2, 1898.

350. STEWART, W. R. H. Cyst of the maxillary antrum. *Brit. Med. Jour.*, Nov. 26, 1898.

351. STEWART, W. R. H. A case of double empyema of the frontal sinus with one infundibulum. *Lancet*, Dec. 10, 1898.

352. HILL, WM. Frontal sinusitis. *Proceedings of Laryngological Society*, London, Nov. 4, 1898.

353. HALASZ. Serous inflammation of the maxillary antrum. *Wiener klin. Rundschau.*, No. 46, 1898.

354. GAVELLO, G. Mucous polyps in the maxillary antrum. *Arch. ital. di Otologia*, vol. vii., p. 82.

355. GONLY. Diagnosis of frontal empyema. *Arch. intern. de lar., d'otol.*, xi., 5.

356. MEYJES. Report of a case of probable pneumatocele of the frontal sinus. *Monatschr. f. Ohrenheilk.*, No. 10, 1898.

357. FURET. Frontal empyema discharging into the maxillary sinus. *Arch. intern. de lar., d'otol.*, xi., 6.

345. All cases due to dental causes heal most readily by cleansing washes only. Teeth with diseased crowns but sound roots may give rise to antral empyema. Where no tooth appears to be the cause, the X-ray will show the existence of an old carious root in the alveolus. Two of the dental cases contained foreign bodies, loose pieces of rubber, and a twelve-year molar respectively. In all ten dental cases the removal of the carious teeth promptly relieved the empyema. Seven acute cases were due to catarrhal causes and lasted from three to four weeks on the average. The opening of one antrum did not accelerate the cure. Four cases were syphilitic with foul discharge due to necrosis and sequestra. One case was malignant, a sarcoma. In seven cases ethmoid disease was associated with antral suppura-

tion, which was cured in two cases by turbinotomy and removal of polypi only. One case only was plainly due to nasal obstruction from polypoid growths.

M. TOEPLITZ.

346. BRVAN reports two cases, the first of a young man æt. eighteen, the second of a young woman æt. twenty-two. The first presented after influenza a swelling at the left inner canthus, which when incised evacuated pus and left a fistula for five months; the latter was then enlarged, the frontal sinus curetted, drainage tube introduced into the nasal duct, and outer opening closed after irrigation of the sinus from the nose. Complete recovery took place. The second case presented under excruciating headaches a cleft in carious left middle turbinate which discharged pus. The turbinate and carious ethmoid cells were thoroughly removed through the nose. The septum between the frontal sinus soon broke down, as could be recognized from sanguinolent discharge from the right nostril. The bone above the left supraorbital ridge was then trephined, the frontal and ethmoidal cells were curetted, caries and septum removed, and the cavity was packed and drained. After the opening of a secondary subperiosteal abscess, the patient was much improved.

M. TOEPLITZ.

347. At a meeting of the Midland Medical Society, held November 2, 1898, MORRISON showed a man, aged twenty-four, who, on October 4th, had been kicked on the upper and inner angle of the left orbit by a pony. Soon after the injury, both the left eyelids began to swell, and some hours later the swelling greatly increased when the patient was blowing his nose, and a little blood-stained mucus came from the left nostril. On October 7th, there was considerable emphysema of the left eyelids. There was some proptosis. Recovery.

CHEATLE.

348. The patient had been wearing a tube through the canine fossa for chronic antral suppuration. The top broke off the tube, but the patient continued to wear it. One morning, on waking, it had disappeared. A photograph taken by Low clearly showed the tube lying across the cavity, high up and close to the nose.

CHEATLE.

349. In the first case GRANT obtained a cure by irrigating the cavity with Lichtwitz's instrument. Fetid discharge had been present for four weeks. In the second, anterior turbinectomy and puncture with Krause's trochar and canula, followed by 12 irrigations, effected the cure; the fetid discharge in this case had lasted continuously for six months.

CHEATLE.

350. A patient, aged thirty-two, came under STEWART'S care in July, 1898, with a history of a swelling which had appeared four years before, below the left eye, with frequent pain. It had remained in same condition until twelve months ago, when a fulness was felt in the mouth; latterly this had increased a good deal. Fluctuation was easily felt between the roof of the mouth and the front of the antrum. Antrum opened in canine fossa, and the very much thinned outer wall removed. Contents found to be clear, glairy fluid, like white of egg, containing white, glistening crystals of cholesterine. Cavity scraped. Tube inserted. Daily antiseptic washing. Cure. CHEATLE.

351. A woman, aged twenty-nine years, suffered with polypi, and discharge from the left side of her nose. STEWART opened left frontal sinus through the brow incision; he then found the septum well over to the left side, with a small hole posteriorly through which pus came. The incision was then continued across the nasal bones on to the right eyebrow. The right sinus was found to have no infundibulum, but opened by the small hole in the septum into the left. CHEATLE.

352. HILL showed a man, aged forty years, on whom he had recently performed the Ogston-Luc operation for chronic suppuration of the frontal sinus. No drainage was employed, and the scar of the short brow incision was scarcely visible.

CHEATLE.

353. HALASZ saw ten cases of serous inflammation of the maxillary sinus. The diagnosis was made from the severe pain at malar bone, the root of the nose, and in the supraorbital region. Aspiratory puncture with Noltenius' trochar confirmed the diagnosis; the fluid was drawn off with a syringe. POLLAK.

354. During an operation for empyema of the maxillary antrum, numerous polyps were found. This is the eighth case on record. GRADENIGO.

355. GONLEY reviews the usual diagnostic items depending on the pain, the rhinoscopic condition, and the result of transillumination. ZIMMERMANN.

356. The frontal sinus was distended, but otherwise normal. The anterior bony wall was as thin as paper. MEYJES regards a closure of the nasal opening as the cause, though he does not explain how such a closure leads to increased intrasinus pressure and consequent distension. KILLIAN.

357. FURET finds a proof in his case for the fact that in most

cases the frontal empyema is primary, and the maxillary sinus becomes affected secondarily and at a later period.

A patient, twenty-nine years old, complained of pain over and below the left eye, and purulent discharge from the nose. An empyema of both the frontal and maxillary sinuses was found present. The frontal sinus was opened, and contained pus and granulations. The maxillary antrum was irrigated for one week through the aspiratory opening in the nose. Both cavities were healed, and the cure was verified three months later. A second case is reported where the antrum of Highmore was healthy, and simply contained pus escaping from the frontal sinus.

ZIMMERMANN.

f—OTHER AFFECTIONS OF THE NOSE.

358. COOLIDGE, A., JR. Cerebro-spinal fluid from the nose. *Boston Med. and Surg. Jour.*, Nov. 17, 1898.

359. REARDON, TIMOTHY J. Osseous cysts of the middle turbinate. *Boston Med. and Surg. Jour.*, Dec. 8, 1898.

360. WINGRAVE, WYATT. Spreading ulcer of the nose. *Proceedings of Laryngological Society*, Dec. 2, 1898.

361. CHEYNE, WATSON. Repair of the bridge of the nose by rabbit bone. *British Med. Jour.*, Nov. 5, 1898.

362. LACK, H. LAMBERT. Fibrinous or membranous rhinitis, and its relation to diphtheria. *British Med. Jour.*, Oct. 29, 1898.

363. BOWLEY, A. Hyperostosis of maxillary and other bones, causing nasal stenosis. *Proceedings Laryngological Society*, Dec. 2, 1898.

364. NIKITIN. Clinical cases. *Monatschr. f. Ohrenheilk.*, No. 12, 1898.

365. LACROIX. A case of nasal vertigo. *Arch. intern. de laryng., d' otol.*, xi., 5.

366. BERNOND. Cystic degeneration of the two middle turbinates; multiple mucous cysts. *Ann. des mal. de l'or., du lar.*, x. 1898.

367. AVELLIS. Tuberculosis of the upper jaw in children, simulating maxillary empyema. *Münch. med. Woch.*, No. 45, 1898.

368. MEYJES. A case of a tooth inverted in the nose. *Monatschr. f. Ohrenheilk.*, No. 10, 1898.

369. LOSSEN. Rhinoplasty with use of a prothesis. *Munch. med. Woch.*, No. 48, 1898.

358. In a boy, æt. thirteen, watery fluid dropped constantly after a violent cold, for five years, from the right nostril, one drop every five seconds, whenever the head was well bent forward or turned upon the face. There was no dropping into the throat nor into the nose when the head was erect. The fluid came from the upper part of the nose. After half an hour's flow, the patient complained of a headache. The fluid was found to be of the same composition as cerebro-spinal fluid.

359. REARDON collected forty-one cases of cysts of the middle turbinate, among which eleven were observed by anatomists, and thirty, including his own, of which he gives a full report, by clinicians. They occur not only in female adults, as obvious from all clinical cases, but also in young girls; they have been occasionally observed in skulls of old men. The microscopical examination revealed: the mucosa to be normal, the cavernous tissue most thick near the bone, covered by a layer of osteoid cells with thickened periosteum internally, detritus of crystals and fat above without a lining mucous membrane. REARDON believes the cysts to be congenital, not due to suppuration, but to ectasia of the ethmoid, or to an aberrant ethmoid cell which developed in the turbinate. The osteophytic changes are produced to reinforce the bony layer against the increasing pressure. A complete bibliography is appended.

M. TOEPLITZ.

360. A man aged fifty, a laborer, was first seen by WINGRAVE on November 14, 1897, when he complained of pain over the nose and stinking discharge of six weeks' duration. On examination, both sides of the nose were full of fetid crusts which on removal showed perforation of the vomerine region of the nasal septum with granulation tissue in all directions. Syphilitic history thirty years previously.

In January, 1898, a red patch appeared on the outside of each ala at the junction of the bone and cartilage; breaking down and ulceration rapidly occurred, the ulceration spreading to the cheeks and upper lip. Pain was considerable and the discharge profuse and fetid. Iodide of potassium and inunction of mercury produced no effect. Bacteriological and microscopical examination gave nothing definite. Injections of mallein and tuberculin produced no reaction. There had not been marked

loss of flesh. The temperature had sometimes been 103° , but for the last six weeks had been about normal. The disease was still progressing.

ARTHUR CHEATLE.

361. At a meeting of the Clinical Society of London, held on October 28th, WATSON CHEYNE showed a youth who, eight years ago, met with an accident through which he lost a large portion of his nasal bones. In January, 1898, a flap was raised from the right side of the nose, exposing the periosteum. The femur was then removed from a rabbit, split into five or six pieces, and simply laid on the periosteum. The flap was then replaced. The wound healed without suppuration ; the result being excellent.

CHEATLE.

362. At a meeting of the Royal Medical and Chirurgical Society, held on October 25th, LACK read an interesting paper on this subject.

The disease was stated as being present in $2\frac{1}{2}$ per cent. of all the children attending the author's hospital practice. A brief analysis was given of the symptoms presented by 36 cases, and the results of bacteriological investigation was reported in 33. The Klebs-Loeffler bacillus was constantly present, generally in pure culture, sometimes mixed with pyogenic cocci, sarcinæ, etc. ; it was usually of the large variety, and its identity was proved by its morphology, and by its growth on various culture media, etc. It was also shown to be full of virulence in animals, to produce virulent toxins, and to be neutralized by antitoxins. Further it was shown to be capable of living for several months on culture media, and by its vigorous growth to crowd out other organisms if present. A previous history of diphtheria was found in connection with one case only. The disease was found to be very infectious in its own form (9 cases occurred in 4 families), and as a mild sore throat (25 instances occurred in 11 families). The Klebs-Loeffler bacillus was also found in healthy throats, in association with these cases.

The conclusion was arrived at that fibrinous rhinitis was a mild variety of diphtheria, the difference in the clinical manifestations apparently depending on some differences in the organisms associated with the Klebs-Loeffler bacillus. Paralytic symptoms had not been observed in any of the cases.

ARTHUR CHEATLE.

363. BOWLBY's case was a woman, aged forty-three, who had noticed nasal obstruction and pain for about eighteen months.

On examination there was exophthalmos, especially on the left side. The left temporal fossa was occupied by a bony growth which was continuous with an enlargement of the left malar and superior maxillary bones. The left supraorbital ridge was thickened. Both maxillary bones showed overgrowth of their nasal processes, but the nasal bones were not enlarged. There was a bony growth in the floor of each nostril covered by smooth mucous membrane, and as large as a large almond. The turbinate bones also appeared enlarged. The palate bones, the alveolar processes of the maxillæ, and the lower jaw were normal. The etiology was not clear. ARTHUR CHEATLE.

364. CASE I. Nasal hydrorrhœa. Chronic rhinitis and adenoids. Fluid dropped steadily from the nose; ceased upon removal of adenoids and administration of extr. hydrast.

CASE 3. Bilateral abscess of cartilaginous nasal septum, probably after influenza. No trauma.

365. LACROIX removed three large mucous polypi from the nose of a patient who had been suffering from attacks of vertigo. These attacks have now ceased for a period of two months after the operation. ZIMMERMANN.

366. In a man, sixty-seven years old, both middle turbinates were covered with large cystic formations, causing obstruction and anosmia. They were retention cysts and contained mucus. ZIMMERMANN.

367. Suppurating fistula beneath lower eyelid, from which a sequester has been cast off. Purulent discharge from the nose containing tubercle bacilli, and caries in the lower meatus. AVELLIS has collected three additional cases with similar symptoms in nursing babies, where the diagnosis of empyema had been made, probably incorrectly, as the maxillary antrum is but $\frac{1}{2}$ mm deep at the fourth month. SCHEIBE.

368. A canine tooth projected into the nose. KILLIAN.

369. LOSSEN reports a case and describes his method of fitting a prothesis. SCHEIBE.

g.—NASO-PHARYNX.

370. COOLIDGE, A., JR. Tumors of the naso-pharynx. *Boston Med. and Surg. Jour.*, Nov. 17, 1898.

371. CHEATLE, ARTHUR H. Section of cyst removed from the naso-pharynx. *Proceedings of the Laryngological Society*, Dec. 2, 1898.

372. CASSIANI-INGONI. The importance of adenoids in the etiology of ear disease. *Arch. ital. di Otol.*, vol. vii., pp. 24 and 186.

373. ARSLAU. The neoplasms of the naso-pharynx. *Arch. ital. di Otol.*, vol. vii., pp. 33 and 161.

374. LICHTWITZ. The rapid extirpation of naso-pharyngeal pseudo-polyps. *Arch. intern. de lar., d' ot.*, xi., 6.

375. BLISS, ARTHUR AMES. The recurrence of naso-pharyngeal adenoids after operations of excision. *N. Y. Med. Jour.*, Oct. 29, 1898.

370. Two boys, aged sixteen, mouth-breathers, had the naso-pharynx filled with a *hard smooth tumor* attached to the basilar process, and with a nasal prolongation in the right and left nostril respectively. They were slowly cut off with stout wire introduced over the nasal tumor and placed around the base; in one of these a previously introduced nasal sponge was left for thirty-six hours. One tumor was a *hard vascular fibroma*. A year later the pedicle had disappeared and the sphenoid cavity could be directly inspected through a large opening on the right side. The other tumor was a fibro-sarcoma. The pedicle did not shrink, but slowly increased and was removed with the écraseur. When left alone the stump slowly decreased, but is still plainly visible.

M. TOEPLITZ.

371. A man, aged nineteen years, came complaining of nasal obstruction. Besides some turbinal hypertrophy and a spur in the nose, a smooth pink mass the size of half a walnut was seen immediately behind the septum and stretching from one Rosenmüller's fossa to the other. Under chloroform it felt tense and was ruptured with the finger-nail before removal. A microscopical section showed a large and a small cyst, each lined with columnar ciliated epithelium, with a slight amount of adenoid tissue outside on the cut surface.

CHEATLE.

372. Noticeable are three cases of the author's of deaf mute children where the result of the operation in regard to hearing was excellent.

GRADENIGO.

373. ARSLAU has collected 121 cases, of which 21 are his own. Frequency, symptoms, and operation methods are discussed.

GRADENIGO.

374. LICHTWITZ calls pseudo-polyps those benign growths with thin fibrinous pedicle springing from the neighborhood of the choanæ. He has observed seven cases of all sizes, with pro-

longations into one or both nasal cavities. He usually operates with Lange's hook, and twice from the mouth. ZIMMERMANN.

375. BLISS has seen nine cases of recurrence of adenoids after their removal: three of his own, one four, one two, and one a year after operation. The second operation removed in two cases some vegetations from the region about the wings of the vomer at their articulation with the vaginal process of the sphenoid, and sphenoidal processes of the palate bones, which, according to Harrison Allen, do not always completely unite, the open areas being filled with vascular tissue. The recurrence of adenoids, as a result of their incomplete removal, is caused by an inflammatory process in parts which have remained. In radical operations, therefore, the parts lying well forward at the vomero-sphenoidal articulation, and the lateral ones above the Eustachian orifice and in Rosenmüller's fossæ should be thoroughly removed.

M. TOEPLITZ.

SOFT PALATE, BUCCAL CAVITY, AND PHARYNX.

376. BOND, J. Large lipoma of soft palate. *Proceedings of Laryngological Society, London*, Nov. 4, 1898.

377. WINGRAVE, WYATT. Preparations of hypertrophied tonsils. *Proceedings of Laryngological Society*, Dec. 2, 1898.

378. WAGGETT, ERNEST. Varix or nævus of the posterior faucial pillar. *Proceedings of Laryngological Society*, Dec. 2, 1898.

379. KEIPER, GEO. F. Albuminuric tonsillitis. *The Laryngoscope*, Nov., 1898.

380. MALHERBE. Chronic pharyngeal catarrh and its treatment with the curette. *Arch. intern. de lar.*, xi., 5.

381. FARACI. Surgical treatment of chronic hyperplastic pharyngitis. *Arch. ital. di Otologia*, vol. vii., p. 7.

382. BOUCHERON. Retropharyngeal abscess in a child of thirteen months. Antistreptococcic serum. Recovery. *Arch. intern. de lar.*, xi., 5.

383. BERGRAT. Mucous patches on the post-pharyngeal wall. *Münch. med. Wochenschr.*, No. 47, 1898.

376. Patient, aged forty years, with a large, semi-fluctuating tumor in soft palate on right side, extending to the left side beyond the mid-line, and on the right behind the angle of the jaw. Eight years ago BOND had removed a large, many lobed fatty tumor, through an external incision, from the parotid region.

CHEATLE.

377. WINGRAVE's microscopical sections were arranged for macroscopical inspection. They illustrated the conditions of simple hypertrophy without inflammatory changes. The points of chief interest were, the scantiness of the connective-tissue elements, the depth of the lacunæ, which reached to the "bed" of the tonsil, and the fact that one aperture was common to several lacunæ. The tonsils, before cutting, had been soaked in collodion, which binds the tissues together and prevents the lymph-follicles from falling out. CHEATLE.

378. WAGGETT showed a young man in whom a knot of dilated veins were present under the mucous membrane of the left posterior faucial pillar, connected above with a small nævoid patch, occupying the surface of the upper part of the corresponding tonsil. The condition was probably congenital. CHEATLE.

379. KEIPER reports the case of a man, æt. thirty-two, with albuminuric nephritis. At the upper portion of the left tonsil an ulcer of the size of a dollar, covered with an exudate resembling diphtheria, was observed, the ground of which appeared as scooped out with a sharp spoon. Treatment with a 12½-per-cent. solution of nitrate of silver produced moderate bleeding. Another hemorrhage was more severe. M. TOEPLITZ.

380. MALHERBE operates on obstinate naso-pharyngeal catarrh in adults with remnants of hypertrophy of pharyngeal tonsil with the curette in bromethyl narcosis, with overhanging head. Seven cases are reported. ZIMMERMANN.

381. Description of an instrument to scarify the pharyngeal wall. GRADENIGO.

382. A very much debilitated child, thirteen months old, presented a fluctuating swelling, extending from the base of the skull to the level of the palate. Suppurating glands of the neck; these were opened, and a pure culture of streptococcus was found in the pus. Antistreptococcic serum was then injected. Four days later, the retropharyngeal abscess on palpation emptied itself through the wound of the cervical glands. The spontaneous recovery was due more to the evacuation of the abscess than to the serum. The cause of the abscess is supposed to be a lymphadenitis after influenza and rhinitis. ZIMMERMANN.

383. Five vertical ridges in the mucous membrane with clouding of the epithelium; the upper ends are indistinct, while the lower ends are rounded. Several other patches on the faucial tonsils and at the base of the tongue. No history of syphilis. Recovery after mercurial inunctions. SCHEIBE.

BOOK REVIEWS AND NOTICES.

I.—**The American Text-Book of Diseases of the Eye, Ear, Nose, and Throat.** Edited by G. E. DE SCHWEINITZ, and B. ALEX. RANDALL, M.D., Clin. Prof. Otology, Univ. of Penna. 1251 profusely illustrated octavo pages. M. B. Saunders, Philadelphia, 1899. \$7.00 *net*.

The ear occupies 188 pages. The first article is by Randall, on the "Anatomy of the Ear, Including Embryology and Histology," 17 pages, with numerous, mostly original, drawings. This article is excellent, and shows the well-known mastery of the author in this laborious field of scientific labor. The second article, "The Physiology of the Ear," by Frank Allport, though short, goes deeper into the subject than many text-books do. The third article, "Etiology and Pathology," is by C. R. Holmes, of Cincinnati; the fourth, "Examination of Patients, the Hearing Tests, and Otoscopy," by J. E. Sheppard, of Brooklyn; the fifth article, "General Therapeutics of Ear Affections," by Cl. J. Blake, of Boston, short and to the point. Then come: "The Affections of the External Ear," by Sam. Theobald, of Baltimore; "Injuries and Diseases of the Drumhead," by H. V. Würdemann, of Milwaukee, with twenty-four brilliantly (!) colored drumhead pictures; "Chronic Catarrh of the Middle Ear," by E. B. Dench, of New York; "Chronic Suppuration of the Middle Ear," by Alb. H. Buck, of New York; "The Complications of Tympanic Inflammation, Mastoid and Intracranial Affections," by Herman Knapp, of New York; "Diseases of the Sound-Perceiving Apparatus," by Hy. A. Alderton, Brooklyn, quite an elaborate presentation; "Operations," by J. Orne Green, of Boston, including the operations for intracranial complications, excellent.

Part III., 374 pages, the **nose** and **throat** is treated of by nineteen authors, very well selected for the subjects allotted to

them—for instance, H. Allen and A. A. Bliss, anatomy of the upper air passages; J. H. Bryan, general etiology and pathology; M. E. Casselberry, acute affections of the nose; M. J. Asch, chronic affections of the nose; R. C. Myles, accessory sinuses; etc.

This American text-book, as we have said in reviewing the ophthalmological part, is prepared with great care and judgment both on the part of the editors and contributors. It is highly to be recommended, and cannot fail to be popular, as there is a large and constantly growing number of men choosing for their life-work the study and practice of ophthalmology on the one hand, or otology, rhinology, and laryngology on the other, or some other combination or restriction, according to their taste, aptitude, and working power.

H. K.

II.—L'Audition et ses Organes. By Dr. M. E. GELLÉ. Félix Alcan, Paris. 1 vol. in 8°, illustrated. 1899. Price fr. 6.

This is a neat and very well-written volume of 324 pages, with many engravings, on physical and physiological acoustics. The laws of sound, the sonorous vibrations the excitant of audition, 132 pages; the auditory organs, peripheric organs, acoustic centres of animals and man, and the intricate nervous auditory paths are well described. The book closes with the auditory memory, obsessions and hallucinations of hearing, and colored audition. Any thinking, educated man, especially an aurist, who can make the time to study this work, will have a high intellectual enjoyment and a valuable addition to his stock of mental property.

H. K.

III.—Electricity in the Diagnosis and Treatment of Diseases of the Nose, Throat, and Ear. By W. SCHEPPEGRELL, M.D., New Orleans, La. Octavo, 403 pages, 161 illustrations. G. P. Putnam's Sons, New York, 1898. Price \$4.50.

The author dwells on the necessity of sufficient knowledge and mechanical skill in electro-physics to use the resources of electrophysiology and electro-therapeutics to advantage. He explains the principles and theories of the various manifestations and laws of electricity, describes the machines, instruments, and apparatus, goes minutely into the details of the appliances used in medicine, omits nothing that can be of benefit in diagnosing and treating the diseases of the nose, ear, and throat, so that the book will be as good for reference as for introduction into this branch of

medicine. The number of subjects in which electricity may be used for diagnostic and curative purposes is very great. Transillumination is, of course, fully detailed, and even the X-rays receive due consideration in three chapters. The numerous and excellent figures are a great help in clearing up many points difficult to understand. The book can be highly recommended.

H. K.

IV.—Chirurgie Opératoire de l'Oreille Moyenne (Operative Surgery of the Middle Ear). By A. BROCA, Surgeon to the Hôpital Trousseau, Prof. agrégé à la Faculté de Médecine de Paris. Octavo, 199 pages, 98 figures. Masson & Cie., 120 Boul. St. Germain, 1899. Frs 3.50.

The author, very favorably known by two larger works which we have reviewed in these ARCHIVES: the one, A. BROCA et F. LUBET-BARBON, *Les Suppurations de l'Apophyse Mastoïde et leur Traitement* (year 1895, p. 250); the other, A. BROCA et MAUBRAC, *Traité de Chirurgie Cérébrale* (year 1896, p. 337), comprehends the topographical anatomy and operative surgery of the mastoid process in a compendium serving as a guide not only to the aural but also to the general surgeon. The presentation of the anatomy of the mastoid is supplemented by an atlas of 50 figures, photographs taken from dry specimens and explained by his pupil, M. CH. MILLET, furthermore drawings of anatomical specimens dissected and drawn by O. LENOIR, interne des hôpitaux. The description of the operations is illustrated by many half-diagrammatic figures drawn under Mr. Broca's supervision by Mr. DEVY. The anatomical specimens are taken from infants up to old people, showing the differences which age causes in the temporal bone, and which are quite important for the operator to know. The object of the little book is entirely practical.

H. K.

V.—Die eitrigen Erkrankungen des Schläfenbeins (The Purulent Diseases of the Temporal Bone Described from Clinical Experience). By Prof. OTTO KÖRNER, of Rostock, Germany. Large-octavo, 153 pages, with 3 heliotype plates and 20 text figures. J. F. Bergmann, Wiesbaden, 1899.

This monograph appears as No. 1 of a series to be published under the title, "Die Ohrenheilkunde der Gegenwart u. ihre Grenzgebiete" (The Diseases of the Ear and its Adjacent Parts). It resembles in spirit, style, and shape the author's admirable mono-

graph, *The Otitic Diseases of the Brain, its Meninges and Sinuses*, of which, three years after the first edition, a second appeared in 1896.

The present treatise begins with an anatomical introduction on the peculiar conditions which are of importance to understand the origin and propagation of suppuration in the temporal bone, and always have to be borne in mind during operations. Seven very fine photographs illustrate these conditions. The examination of the patient and considerations on operations of the mastoid conclude the general part.

The special part begins with the diseases of the temporal bone by the usual *pus cocci*.

A. Acute Otitis and Osteomyelitis.—The symptoms are concisely and attractively detailed. The complications are derived chiefly from 81 successive mastoid operations (chiselling into antrum and exposing all further foci of suppuration and decay), which showed: (1) The destruction of the bone had penetrated into the sulcus sigmoideus in 17 cases, (21 per cent.) of which 3 cases with sinus phlebitis, 2 fatal; (2) it had penetrated into the middle cranial fossa in 6 cases (7.4 per cent.), of which one died from lepto-meningitis. Of the 15 cases with intracranial complications, 6 were without a single external symptom indicating the bone affection. The author considers *percussion of the bone* a valuable symptom of diagnosis, and gives a tabular synopsis of 11 cases, in 10 of which the dulness of the percussion tone was manifest and the supposed internal mastoiditis confirmed by the operation. One case was unavailable: diabetic coma, no operation; death, no autopsy.

The reviewer heartily agrees with the author's treatment of acute otitis media. Above all the patient has to keep his bed. As soon as the trias—fever, pain, and bulging of the drumhead—is present the drumhead should be incised. No inflation by any method; syringing only in exceptional cases where tenacious mucus sticks to the canal. No local treatment (leeches, tincture of iodine, and the like) of the mastoid, excepting the ice-bag. As regards the application of cold to inflamed mastoids, several New York aurists, the reviewer included, have abandoned the Leiter coil and all applications of cold, since in many cases they found out that the cold, though grateful to the patient, only masked the inflammation and retarded the proper treatment—the operation.

The operative procedure of the author is the one now prevalent

all the world over. His results in the 81 successive acute cases have been : 5 unavailable, being lost sight of ; 4 fatal, 3 of which by complications present at the operation—that is, the operation came too late ; undisturbed recovery of the osseous wound in 57 cases, after-operations necessary in 14. Follows a short description of necrosis of the labyrinth.

B. Chronic Otitis of the Temporal Bone.—Introduction : osteo-sclerosis of the mastoid. Then follows (*a*) : The description of a chronic otorrhœa without entrance of epidermis into the middle-ear cavities. The author performs the “radical operation” only when the bone is manifestly diseased, drawing the indications narrower than Stacke and many others do. He rejects the so-called prophylactic operations.

(*b*). Otorrhœa with entrance of epidermis into the middle-ear cavities (otit. med. desquamativa, pseudo-cholesteatoma) and the true cholesteatoma. The author distinguishes with Kuhn and others these two forms of epidermic formations in the temporal bone, the latter, the true cholesteatoma, being a heteroplastic formation, originating in embryonic life.

(*c*). The isolated necrosis of the cochlea, usually complicated with facial paralysis, is mostly fatal.

The monograph concludes with chapters on tuberculosis, actinomycosis, and malignant tumors of the temporal bone, and some remarks on hysterical symptoms simulating disease of the temporal bone, the so-called mastoid neuralgia.

This newest monograph of Körner, though far from being an exhaustive treatise, gives a concise, objective, judicious, and rather conservative presentation of the suppurative diseases of the temporal bone, based chiefly on personal observation. Its style is more that of an attractive essay than of a severe text-book. With these advantages, the name of the author, and the excellent typography, the book cannot fail to command a large circle of readers.

H. K.

VI.—Progressive Medicine. A quarterly digest of advances, discoveries, and improvements in the medical and surgical sciences. Edited by H. A. HARE, M.D., Prof. Therapeutics and Mat. Med., Jefferson Med. Coll., Phila. Vol. I., March, 1899, 479 pages in octavo, contains surgery of the head, neck, and chest. Diseases of children. Pathology. Infectious diseases, including croupous pneumonia. Laryngology and rhinology (by A. LOGAN

TURNER, M.D., Edin.). Otology (by Dr. ROBT. L. RANDOLPH). To the last two chapters, which concern our readers particularly, 90 pages are devoted. The reports are neither systematic nor complete, but constitute abstracts of selected papers, some accompanied by reproductions of the figures of the originals. As far as the abstracts go, they are very good.

H. K.

MISCELLANEOUS NOTES.

ANNOUNCEMENTS.

BRITISH MEDICAL ASSOCIATION, ANNUAL MEETING, PORTSMOUTH, AUGUST 1, 2, 3, 4, 1899.

Section of Laryngology and Otology. President, E. CRESSWELL BABER, M.B. ; Secretary, HERBERT TILLEY, M.D., 101 Harley St., London, W.

Subject of special discussion : "The Diagnosis and Treatment of Chronic Empyema of the Frontal Sinus."

Foreign visitors will be cordially welcomed in the Section, and are requested to send to the Secretary their names and the title of any communication they may wish to make.

SIXTH INTERNATIONAL OTOLOGICAL CONGRESS, LONDON, ENGLAND.

August 7th, 7 P.M.—Reception by the President, Dr. URBAN PRITCHARD.

August 8th to 10th.—Sessions. Subject of special discussion : "Indications for Opening the Mastoid in Chronic Suppurative Otitis Media." Introduced by W. MACEWEN, Glasgow ; H. KNAPP, New York ; LUC, Paris ; A. POLITZER, Vienna.

August 12th.—Excursion with ladies.

Secretary, E. CRESSWELL BABER, Brighton ; Treasurer, A. E. CUMBERBATCH, 40 Portland Place, London, W.

Contribution, \$5, for participation in the proceedings and a copy of the Transactions of the Congress.

An exposition of specimens and instruments will be a feature of the Congress. The English are great collectors, and CHAS. A. BALLANCE, Vice-Chairman, and A. H. CHEATLE, Secretary, 117 Harley Street, W., work hard to make this museum a success. Collections may be deposited at the Examination Hall, Victoria Embankment, until August 5th.

THE VICTORIA EYE AND EAR HOSPITAL, DUBLIN.

At the second annual meeting of the above institution, held on February 14th, it was stated that a site for the new hospital had been approved. The estimate for the new building was £30,000, of which £19,000 had been received.

It was announced that Dr. C. E. FITZGERALD had resigned his position as Surgeon, owing to other demands upon his time.

BEQUESTS.

The late Mr. WILLIAM ROBERTS, of Manchester, bequeathed £1000 to the Old Trafford Deaf and Dumb Schools.

The late Mr. WILLIAM TAYLOR, of Southport, has bequeathed £500 to the St. Paul's Eye and Ear Hospital, Liverpool.

The late Mr. WOOLF JOEL has bequeathed £100 to the Central London Throat, Nose, and Ear Hospital.

APPOINTMENTS.

BENNETT, F. D., M.R.C.S., has been appointed Assistant Anæsthetist to the Royal Ear Hospital, London.

WOAKES, CLAUD, M.R.C.S., has been appointed Surgeon to the London Throat Hospital, Great Portland Street.

LARYNGOLOGICAL SOCIETY OF LONDON.

The following have been elected office-bearers for the ensuing year :

President : F. DE HAVILLAND HALL, M.D.

Vice-Presidents : A. BRONNER, M.D. ; W. R. H. STEWART, F.R.C.S., Ed.

Treasurer : CLIFFORD BEALE, M.D.

Librarian : J. DUNDAS GRANT, M.D.

Secretaries : WM. HILL, M.D. ; LAMBERT LACK, M.D.

Council : EDWARD LAW, M.D. ; WALTER SPENCER, M.S. ; F. W. MILLIGAN, M.D. ; A. BOWLBY, F.R.C.S. ; HERBERT TILLEY, M.D.

CORRECTION.

In my paper entitled "A Plea for a More Accurate Definition of Tuning-Forks," which appeared in the February number of these ARCHIVES, an unfortunate mistake was made in defining the Physicists' C as composed of 512 double vibrations, whereas it should read 512 single vibrations ($C = 512 \text{ v. s.}$).

J. ORNE GREEN.

ARCHIVES OF OTOTOLOGY.

A MODIFICATION OF KÖRNER'S PLASTIC IN OPERATIONS FOR CHOLESTEATOMA.

BY PROF. F. SIEBENMANN, BÂLE.

Translated by Dr. ARNOLD H. KNAPP, New York.

(With three illustrations in the text.)

IF we examine a corrosion specimen or a topographical cross-section which passes through the skull in the plane of the auditory canal, including the skin, auricle, and bone, and is carried back and up into the mastoid antrum, then the posterior wall of the antrum projected on the side of the head and the auricle corresponds to the anterior wall of the antihelix, in fact to that part which, according to Schwalbe, can be called the point of bifurcation of the truncus helix. To produce a persistent intra-auricular opening which will freely expose the antrum, we must proceed, according to Körner, to prolong the section of the posterior wall of the auditory canal externally into the cyma conchæ. A section extending to the anterior margin of the auricle, the limen conchæ (Schwalbe), will give a broad communication between the canal and the antrum; but this has no especial advantage over the original method of Zaufal, where the intervening bony and membranous wall were removed. A persistent full exposure of the antrum cannot be thus obtained.

We have often encountered this inconvenience, even with Körner's plastic, as the non-resistant cartilaginous part of flap would again rise up on its base during the healing of the wound and approach its previous position, so that after healing the outer opening of the canal would resume its original

shape and hide the extreme upper part of the antrum like a screen. This result, as repeatedly shown by the experience of myself and others, may in certain conditions (putrefaction of epidermis scales, retention of mucous secretion in the cicatricial clefts of the hidden parts) be of unpleasant consequence to the patient, especially if beyond the reach of a competent physician.

For these reasons I have made a practice in recent years of resecting the cartilage of the soft parts which were employed as flaps in the plastic, in all operations for cholesteatoma. A large intra-auricular opening has thus been obtained which did not later contract, and answered every purpose, practically as well as cosmetically. Differing from Körner, I divide the posterior membranous canal with the probe-pointed knife with a single incision, running from within outward. At the prominent margin of the cartilage (the limen conchæ) the single incision bifurcates and a flap is formed out of the concha by the two diverging incisions, which are prolonged to the antihelix. The one passes back and up through the crus helices, where it joins the ascending anterior limb of the helix. The lower incision has a more horizontal direction. The size of the angle at which the two latter incisions diverge depends on the size of the cholesteatoma cavity. The entire incision has a horizontal Y shape (see Fig. 1), forming through its three limbs an upper, outer, and lower flap. The outer flap contains the upper half of the cavity and the cymba conchæ, the upper and lower flaps correspond to the original posterior membranous canal and the neighboring part of the auricle.

The subsequent steps depend upon the size and position of the cholesteatoma cavity. If this is not very large, the skin is dissected from the cartilage of the outer (the concha-cymba) flap; the cartilage itself, with the thick fibrous mass at its medial end, is cut away, leaving a thin cutaneous flap, which is later to be applied against the post wall of the wound. If the cholesteatoma cavity is so large that its external wall is reduced to a thin, compact, bony plate, we cut away the cutaneous flap as well as the cartilage, and suture the auricle so that the skin of the antihelix is continuous

with the cholesteatoma matrix of the posterior wall of the wound.

Should the cavity extend unusually far backward, the antihelix and the entire auricle must be pushed back on the lateral side of the head. This is easily obtained by resecting a semilunar piece of skin along the posterior margin of the retro-auricular wound. The posterior attachment of the

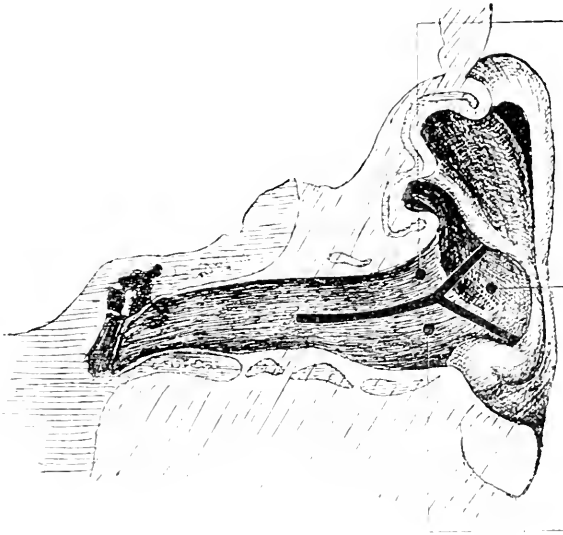


FIG. 1.

auricle is now set back and the auricle is more firmly applied to the side of the head. To obtain a good opposition of the wound margin after this resection of the skin, it may be necessary to enlarge the anterior wound margin by means of a suitable notch (Fig. 2). If the cartilage is abnormally resistant and thick, it is usually necessary to resect a portion in the upper and lower flaps of the canal at their tip and margins to make them more pliable.

Körner's restriction that his procedure is not suitable for cholesteatoma cavities and for narrow auditory canals, is done away with in my modification. To insure a wide outer opening it is important to remove well the outer two thirds of the ridge between canal and antrum, leaving only the

inner part adjoining the tympanic sulcus and facial canal. Moreover, before inserting the skin sutures, deep catgut sutures should be applied in the upper and lower angles of the wound, which approximate the divided deeper tissues and fix the flaps in their new position. By following this suggestion we have never had occasion to rely upon firm packing to keep aditus, antrum, and canal freely exposed;

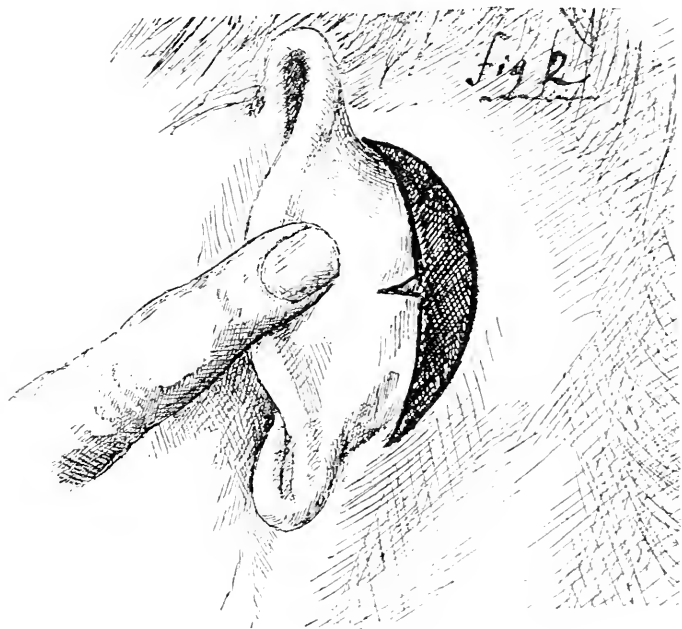


FIG. 2.

also in our retro-auricular method. For the skin we generally use sutures of aluminum-bronze wire. Further detail and the after-treatment of operation for cholesteatoma are described in a previous paper, published in the *Berliner Klin. Wochenschr.* (1891, Nos. 1 and 2). The process of healing when no transplantation has been done takes between four and ten weeks, according to the depth and extent of the cholesteatoma. The largest cavities usually require the shortest time, as I have previously discovered for the cholesteatoma with permanent retro-auricular openings, and

have described (*l.c.*). The external opening appears after healing as if enlarged to a square; its form and extent are visible in Fig. 3.

My reasons for abandoning the single long tongue-shaped flap are not new; it is much more convenient to be able to overlook the entire posterior wall of the cholesteatoma cavity after the operation, and not to run any risk of transplant-



FIG. 3.

ing flaps on already epidermized areas. If epidermization does not take place rapidly, the area can be curetted after two weeks and covered with grafts.

The establishment of a large opening, which really overlooks the antrum and permits ventilating, cleansing, and treatment without the aid of the specialist, can at present be considered the ideal operative treatment of cholesteatoma. Hence I have given this method the name of radical operation, which in an operation for *cholesteatoma* is surely justified. The phrase, "radical exposure of the middle-ear cavities," should not be applied to the Zaufal-Stacke opera-

tion if the large cells at the mastoid tip and in the tympanic floor are not opened.

As to the position of the large opening corresponding to the lateral antrum wall,—whether in the concha or behind,—it is not of great importance for the safety of the patient. From a cosmetic point of view, it is undecided whether the retro-auricular opening covered by the auricle and hair is really less favorable than a sufficiently large and freely exposed opening in the concha. I have obtained good results by either method. The importance of cosmetic reasons should not be exaggerated; it is better to operate so that the patient may later be as independent of the aural surgeon as he was previously.

OTITIS MEDIA NEONATORUM—A CONTRIBUTION TO THE EMBRYOLOGY OF THE MIDDLE EAR.

BY DR. L. ASCHOFF, GÖTTINGEN,

FIRST ASSISTANT AT THE PATHOLOGICAL LABORATORY.

Translated and Abridged by DR. CHARLES NORRIS, New York.

THE old problem concerning the nature of the so-called otitis media neonatorum has lately been revived, and its solution on the basis of modern bacteriologic methods has been stimulated by the recent bacteriologic and clinical investigations of Netter, Gradenigo and Penzo, Haug, Rasch, Kossel, Hartmann, Walb, on the suppurative middle-ear inflammations of children, concerning which, heretofore, only pathological investigations obtained.

It has long been known that the middle ear of children frequently contained fluid of a suppurative character.

Is this fluid a physiological one, or is it caused by a suppurative inflammation? Unfortunately the recent bacteriologic investigations have not yet settled this matter. Whereas Gradenigo and Penzo refer the changes present in the middle ear of the new-born, in the majority of the cases, to the rapid putrefaction caused by the saprophytic organisms which they found in their cases, and not to actual inflammatory processes. Rasch says, "However absurd it may seem, otherwise rational men have declared it to be a fact that pus in the middle ear of small children is due to a physiological process," and further on says of their investigations that "they cannot succeed in giving the finishing stroke to the old Tröltsch-Wreden conception of the fre-

quency and significance of the aural inflammations of small children."

Recent authors (Hessler, Schmaltz) favor the view that pus in the tympanum of the new-born is an indication of a suppurative inflammation.

The well-known clinical investigations of Hartmann have placed the frequency of suppurative middle-ear catarrh in children upon so certain a basis that the inflammatory nature of the middle-ear contents in the new-born seem thereby established. The lively interest which these investigations, especially of Hartmann's, called forth is shown by the issue of an ordinance in 1895 by the government, which ordered a careful investigation of the ears of the children in the clinics, lying-in hospitals, etc.

The Pathological Institute of Göttingen was therefore asked by the board of managers of the Maternity Hospital of Hanover to note the condition of the ears of all the infants sent for autopsy.

According to my views the suppurative middle-ear catarrh of infants and children must be sharply separated from the otitis media neonatorum. The existence of the former has been proved above all others by Hartmann. Is there, then, an otitis media neonatorum?

To solve this question one must recognize three main considerations: 1. The bacteriologic findings of the middle-ear contents. 2. The microscopic conditions of the same. 3. The microscopic condition of the mucous membrane of the middle ear in every case.

As results similar to those of Gradenigo and Penzo were obtained, and on account of the length of time elapsing between death and autopsy, together with the shaking up of the cadavers due to transportation, bacteriological work was stopped. The bacteria of putrefaction were regularly found. I believe, however, that the microscopical examination furnishes a guide to the condition of the middle ear of the new-born.

The results of this investigation are tabulated; reference to which must be had in the original. The methods employed are briefly as follows: Both temporal bones were

removed with chisel and hammer, and thoroughly washed by a strong stream of water. The usual procedure of removing the top of the tympanum was soon given up because a survey of the cavity was not readily obtained. Opening with the chisel carries only too easily foreign material into the middle ear, and this must be most carefully avoided in order to make a positive diagnosis possible. The Eustachian tube was opened with a strong pair of scissors, along its upper wall, the incision being continued in a straight direction through the tegmen tympani till the pars squamosa was reached. Strong opposition is usually here first met with. For this reason, with a stronger pair of scissors, from the outside in an opposite direction, the rest of the pars squamosa and the outer wall of the tympanum are cut until both incisions meet, the tube and the ear cavity being now opened from above. When the outer wall of the tympanum has been cut sufficiently deeply, one can now, as Blumenstock did, unfold the anterior and outer wall, together with the drum membrane, from the inner and posterior wall, as one opens a bivalve shell, and survey the whole cavity, tube and antrum. A further cut along the inferior wall of the tube may be necessary. Usually only one of the temporal bones was opened, the fluid contents were aspirated by a fine pipette, spread upon a cover-glass, and examined in the fresh condition. Both bones were now placed in 10% formol-Müller solution, and placed in the incubator at 37°C for a few days. Decalcification in 2-3 days in a 10% nitric acid formol solution (10 parts of nitric acid to 100 parts of a 10% formol solution). This new nitric acid mixture, long employed by Beneke of Brunswick, gives excellent results.

A survey of the table to one familiar with the literature presents absolutely nothing new. It confirms what every careful observer during the last decade has observed and published. A review of all these investigations presents the following conclusions: That the middle ear of the new-born, in respect to the condition of its walls, the size of its cavity, and the composition of its contents, presents great variations, even as regards the ears of the same individual. Even

if the cases alone are taken into consideration where there can be no possibility of an infectious disease, as fresh still-births, or such cases as have lived only a few hours, we find the contents, barring air, to present all gradations, from a serous mucous fluid up to thick viscid pus.

The first exact microscopic investigations of the contents of the tympanum come from Koppen. He writes: "I may be allowed to conclude that during embryonal life, and in the first period of independent existence, the tympanum is always filled with a more or less thick fluid. As regards the character of the fluid, the upper layers consist of a grayish to yellowish sero-hemorrhagic fluid, whereas at the bottom of the fluid there is usually a tenacious thick mass, which in several cases contained cheesy particles. The upper layers of the fluid consist undoubtedly of serum expressed out of the blood. The deeper, thicker masses swell up in water, are precipitated by acetic acid as threads, and are considered to be mucous. Besides there is always present in abundance fat, pieces of mucous membrane, and the greatest variety of epithelium."

Tröltzsch reported at a meeting of the Würzburg Medical Society the finding of pus in the ears of the new-born, and in sucklings, and founded the theory of the inflammatory nature of otitis media neonatorum.

Since that report of Tröltzsch, the discussion on the subject has been a lively one. Schwartz, Wreden, Wendt, Hofmann, Kutscharianz, supported the theory of inflammation, whereas Brunner, Schmaltz, Politzer, v. Kolliker, with the aid of widely different experimental demonstrations, declared the process to be a physiological one. The latter investigations were especially concerned in the embryological development of the tympanum.

Since Tröltzsch's investigations, it has been known that the tympanum of the fœtus is filled with a mucoid tissue, and that later the tympanic cavity is formed by the disappearance of this tissue. How and when it occurs is a mooted question. Tröltzsch speaks of shrinkage, of an increased desquamation, of a decay starting from the surface. Wre-

den of a resorption without decay or pus formation. Zaufal of a decay with formation of particles similar to pus, of a synovial-like fluid.

Wendt considers it to be a retrogressive process, caused by a quick and considerable diminution of the intracellular fluid, induced by mechanical pressure during inspiration, air, alone or with amniotic fluid, being aspirated into the tympanum. The actual transformation of the mucoid into fibrous tissue occurs during the first days of extra-uterine life. Wreden's and Wendt's views led to the establishment of the ear test, as a medico-legal test, which, however, only enjoyed a short life.

An actual tympanic cavity, in other words the disappearance of the mucoid tissue, was held to prove the occurrence of intra-uterine or post-partum energetic respiration, a view which Eulenburg and Hofmann supported, with, however, more or less reserve.

Moldenhauer held that the transformation of the mucoid tissue into fibrous tissue began in the second half of pregnancy, but that there is no free tympanic cavity owing to the close approximation of the hyperæmic mucous membrane. The swollen condition of the mucous membrane suddenly disappears with the onset of an anæmia, at the moment of extra-uterine, rarely intra-partum, respiration; air and fluid then enter the cavity. He himself was never able to detect amniotic fluid.

Wendt's ear test received its first dangerous attack through the investigations of Blumenstock. He found the tympanum open in macerated fœtuses in whom intra-uterine aspiration had not occurred, as shown by the absence of amniotic fluid. Furthermore, in fœtuses which had respired energetically after birth, amniotic fluid without air was found present; results which could hardly be brought in harmony with the statements of Wendt and Wreden.

Kutscharianz went still farther, and declared that the swollen cushions of mucous membrane of the tympanum disappeared completely during the last months of fœtal life, and that the tympanum of mature fœtuses was covered with a thin and completely developed mucous membrane. The

cavity is filled with a clear fluid, and pus denotes a pathological condition.

Likewise Schmaltz found the incongruity of the thickness of the mucous membrane to the fact of respiration having occurred, but in opposition to Kutscharianz emphasizes the great variations in the development of the cushions of the mucous membrane at the end of pregnancy, absolutely independent of the occurrence of respiration. The constituents of the amnion in the ear does not signify necessarily that respiration has occurred. These can reach the tympanum simply through movements of deglutition.

Lesser, in a partial confirmation of Schmaltz's statements, arrives at the following conclusions :

I. The apniotic foetus—at seven months—has a tympanum filled with fluid.

II. Only after several hours of respiration does the fluid become mixed with air. The rapidity with which the air displaces the fluid does not stand in constant proportion to the duration of extra-uterine life.

III. Intra-uterine respiration causes no change in the composition of the contents of the tympanum. The apniotic and the asphyxiated new-born show constituents of the amnion in the middle ear.

Hnevkovsky gave the ear test its death-stroke. According to his researches, the disappearance of the swollen cushions of mucous membrane begins at the 5-7 month: a lumen is thus formed, which becomes filled with fluid derived from the mucous membrane, or with amniotic fluid. The latter is acquired either by aspiration or by movements of deglutition, or even after death by diffusion and capillarity. Consequently the demonstration of amnion proves nothing.

This completes, so far as I have been able to find, the pathological investigations that have been made.

Since the recent bacteriological and clinical investigations rather sustain the inflammatory theory, I will attempt, with the aid of my series of cases, to answer the following six questions already partly answered.

1. What is the character of the fluid in the tympanum of

the new-born, *i. e.*, of children either born dead or that have lived but a short time? A survey of the table shows the contents to be very variable. In accord with previous authors the following solid constituents were made out:

a. Polymorphonuclear leucocytes, pus cells, mostly with fatty degeneration more or less intense.

b. Larger and smaller round cells, with a simple round nucleus, usually replete with fat droplets, the so-called *Körnchenzellen*, partly of gigantic proportions.

c. Desquamated nucleated flat epithelium from the tympanum, mouth, or vaginal mucous membrane; also cylindrical and ciliated epithelium from the mucous membrane of the tympanum.

d. Vernix caseosa, in the form of clumps of non-nucleated, stratified epithelium and lanugo.

e. Meconium, characterized by its corpuscles.

f. Cholesterin crystals and pigment.

The so-called pus and pus flocculi were composed in greater part of leucocytes and *Fettkörnchenzellen*. As will be shown later, these are not to be considered as a result of a bacterial infection, but simply as a collection of leucocytes such as we are wont to see, for instance, in the crypts of the tonsils. The white flocculi were mostly composed of vernix caseosa. The meconium imparted the more or less marked yellowish-green color to the solid and fluid constituents.

According to the variations in the contents, for classification I have distinguished five groups:

1. The contents consist of air, or a clear muco-serous fluid, or of a mixture of air and fluid—thirty-nine cases in all.

2. It consists of a more or less cloudy thin fluid, with small yellow flocculi that are seen with the microscope to consist of collections of leucocytes. Sero-purulent contents were found in twelve cases.

3. The contents are more mucoid and tenacious in character, slightly cloudy, or beset with thicker yellowish flocculi, composed of leucocytes and *Körnchenzellen*. Such a muco-purulent fluid was present in thirteen cases.

4. More or less tenacious and large pus plugs were present in twenty cases.

5. Constituents of the amnion, vernix caseosa, and meconium were found in twenty-seven cases.

Omitting from the fourth group the cases of the children which had lived longer than twenty-four hours, there still remain nine cases with thick pus. Since a sharp separation between 1 and 4 does not obtain, the answer to the first question is as follows :

In the tympanic cavity of the new-born, so long as a complete displacement of the fluid by air has not taken place during extra-uterine life, fluid is found present, varying in appearance from clear liquid to a tenacious mucoid pus plug.

2. Is the finding of pus, *i. e.*, a collection of leucocytes, a physiological occurrence, or does it depend on special conditions?

A survey of my second table reveals the fact that the child being still-born, or dying shortly after birth, exercises no influence upon the character of the aural contents. A great variation as regards the length of life is especially noticeable in my cases with pus in the tympanum

Another fact deserving of notice is that of the 33 cases with pus, in 19 of them distinct signs of the presence of amnion were demonstrated, but only twice in the 39 cases with an intact tympanum. This enables us to conclude that an infection with amniotic fluid, if I can so name it, induces the collection of leucocytes, for in those pus cases where constituents of the amnion are scanty, the latter may be easily overlooked.

As Schmaltz maintains that the amniotic constituents can penetrate into the tympanum by simple movements of deglutition, therefore these should be found in every foetus. In order to proceed with certainty I have examined the foetuses of earlier periods in respect to the contents of the tympanum. Nine foetuses in all were examined, varying in length from 11 *cm* to 27 *cm*.

These investigations show that at an early period, namely, in the fourth month, when the cavity begins to develop, polymorphonucleated pus cells may appear. These are derived from the mucous membrane, as one may conclude from the result of its examination. The emigration of the leuco-

cytes into the cavity of the tympanum does not constantly occur. What are the causes of this emigration of leucocytes? The cushions of mucous membrane lining the tympanum, as is well known, decrease in size after the middle of pregnancy. We are unacquainted with the finer details of the process. It is plausible to suppose that the leucocytes participate in this retrogression, if they be found in every case. I have several times observed fine granular, fatty infiltration (*Verfettung*) of the tissue elements.

In Flemming preparations the large round cells imbedded in the meshes of the connective tissue are filled with fat droplets. The sustentacular cells proper remain free. The leucocytes which appear in the tissue are all of them overladen with fat droplets. No connection between the leucocytes and the large round cells. The leucocytes in the blood-vessels also contain fat droplets. Unable to come to a conclusion by this method, I believe that I have recognized the cause of the emigration of leucocytes in another and important fact.

As early as the fourth month in *fœtuses*, flat epithelial cells were found in the pus. These in part possessed large, oval, well stained nuclei, and were entirely similar to the flat epithelium of the tympanum, and buccal cavities.

Does a desquamation of the epithelium of the tympanum occur? For this I have found no support. The fact of its occurring in only a few tympani would be remarkable.

Epithelium from the buccal cavities it might well be. Many cells with shrunken nuclei, or rarely non-nucleated, are also present. I have not found shrinkage or loss of the nucleus in the buccal epithelium. The possibility alone remains that they come from the amnion.

Does the amnion contain at this period epithelium with nuclear remnant or only non-nucleated scales? Quite accidentally I had the opportunity to investigate the contents of an unopened amniotic sac of the 4-5 month. As in the tympanum there were found nucleated flat epithelium, such with shrunken nuclei and non-nucleated markedly fatty cells. Large masses, in layers, of the finest epithelial plates, as one finds in the *vernix caseosa*, were not present. Pigment was

also found. I consequently came to the conclusion, that as early as the fourth month of pregnancy, constituents of the amnion entered the tympanum—of course not in all cases.

Thrice the tympanum was found empty, twice a scanty collection of leucocytes, but no flat epithelium. As serial sections of the ears were unfortunately not made, the proof is here wanting. In the other four *fœtuses*, with a more marked collection of leucocytes, constituents of the amnion were demonstrated.

How does the amnion reach the tympanum of such *fœtuses*? I have as yet found no proof of intra-uterine respiratory movements at this period, and consequently admit the possibility that the movements of deglutition are capable of causing the passage of the fluid (Schmaltz). As mentioned, these do not lead to a contamination of the tympanum in all *fœtuses*. It is hard to furnish an explanation.

The occurrence of pus, even in the new-born seems sufficiently explained. I believe that with careful examinations in all cases when pus is found in the tympanum of the new-born, the constituents of the amnion will be found. Unfortunately my investigations of the *fœtuses* were made later, so that it was impossible subsequently by a close search of the tympanum to demonstrate their presence in all my cases.

It was a striking fact that in the cases with abundant pus, amnion constituents were frequently found. These must have been in abundance, and the finding of the adherent meshes of vernix caseosa is confirmatory evidence.

These latter particles could hardly have been brought into the tympanum through deglutition, since a stronger force would seem necessary. I shall presently revert to this. The presence of meconium in the pus masses is important in regard to the causation of the emigration of the leucocytes.

Apparently the larger hairy particles of the vernix and the meconium produce an especially intense irritation upon the mucous membrane, and the leucocytes in such cases are very abundant.

To conclude: pus formation in the tympanum is not a physiological one, that is, a necessary advent to the forma-

tion of a tympanic cavity, as it is not found in all cases. It is the consequence of a—frequently as early as the fourth month—contamination of the tympanum with the amniotic waters. When the larger masses of vernix and meconium are introduced, the pus formation is the most marked, which results in a complete filling of the cavity with pus.

An explanation is not easy to offer for those cases when, in spite of the presence of vernix and meconium, no suppuration is present. A certain length of time is required for the emigration to lead to the formation of pus. It remains absent, however, or is interrupted at an early period, when death follows shortly after the contamination of the tympanum. In mature still-born fetuses, born fresh, the contamination can have taken place shortly before birth.

3. Do the changes in the mucous membrane of the tympanum correspond with the varying character of its contents, especially such change which would aid in determining the bacterial nature of the suppurative inflammation?

In all my cases where no especial contents were found, no changes in the mucous membrane were present which would point to an inflammation. Here and there every tympanic mucous membrane contains a few leucocytes. The marked distension of the blood-vessels often present, and the hemorrhages, are the result of asphyxia. A reddened mucous membrane does not by any means signify that it is inflamed.

The infiltration of leucocytes is most marked where there is pus in the tympanum, and reaches sometimes a high degree.

The epithelium, however, is always preserved; at the most only injured by the asphyxial hemorrhages. The infiltration, however, is not to be compared in its extent with that obtaining in the bacterial otitis media of sucklings, as in two of my cases.

My conclusions are as follows: The mucous membrane of the tympanum shows in the new-born a cellular infiltration corresponding in degree with the intensity of the irritation which the smaller masses of vernix and meconium exert, but it never reaches such a degree as is seen in cases of bacterial otitis media. A perfect picture of a slight

inflammation is presented when the hyperæmia and the hemorrhages due to asphyxia complete the resemblance.

4. Can the presence of the grosser constituents of the amnion, vernix caseosa, and meconium be accounted for by aspiration processes?

I believe to have proved that isolated cells from the amnion reach the middle ear in the early months of foetal life.

What mechanical causes (movements of deglutition?) effect this transport must still be left unanswered. The question of how the larger particles of vernix caseosa and meconium enter is apparent. The facts presented at the conclusion of the second question, the finding of vernix, etc., without pus, in the fresh still-born, indicate that the respiratory movements which so frequently occur early are the causes of the aspiration into the tympanum.

The asphyxial hemorrhages into the mucous membrane of the tympanum prove how markedly the tympanum participates in the changes of pressure of the respiratory passages. A further proof is had in the simultaneous aspiration of the constituents of the amnion into the lungs of the same cases. The lungs must be thoroughly searched to obtain proof in every case of aspiration. The autopsies during the students' courses account for the large gaps in my statistics relative to this point. The frequent coincidence of aspiration into the tympanum and lungs is shown, however, by the exact critical summaries of Lesser.

The negative cases, in which children have breathed for a considerable period, are naturally barred, as here a subsequent cleansing of the lungs through attacks of coughing might have taken place. Nevertheless there remain twelve cases, in nine of which constituents of the amnion in the tympanum were found, and in eight of these nine cases likewise demonstrated in the lungs.

The frequent occurrence of pulmonary aspiration speaks against the view that the movements of deglutition, which occur in every child, cause the passage of the gross particles into the tympanum. Therefore, as the post-mortem entrance of such large quantities of amnion into the ear as we

found in a few cases is not to be considered, the answer to the fourth question is as follows:

The occurrence of the gross particles of the vernix and meconium in the tympanum of the new-born is due to intra-uterine respiratory movements.

5. Is the retrogressive change in the cushions of mucous membrane due to conditions of gross mechanical pressure and does this stage of retrogression warrant the conclusion as to whether intra- or extra-uterine respiration has occurred?

The investigation of the fœtuses and the findings in the new-born have furnished the proof, in confirmation of the results of earlier authors, that, independent of the entrance of amnion and air in the early months of pregnancy, the formation of an actual cavity begins with the separation of the epithelial covered walls of the cleft, the canalis tubotympanicus. The transformation of the mucoid tissue occurs gradually during the last months; in a few cases, after birth. The cavum tympani filled with a fluid, containing a varying amount of mucus and more or less large numbers of fatty leucocytes and Körnchenzellen. The significance of the latter and their origin from emigrated round cells or desquamated epithelial cells, remains in doubt. The presence of similar cells in the meshes of the tissue speaks for the former origin.

A marked desquamation of the epithelium of the mucous membrane, with preservation of their shape, does not occur. The lining of the tympanum is quite as variable in its earlier as in its later stages.

The determination of the extent and the presence of the thick cushions of mucous membrane consisted in most cases in an inspection of the tympanum and antrum, in the fresh condition.

The thickness of the cushions depends somewhat on the state of fulness of the blood-vessels. The determination thus refers only to such gross differences as are visible to the naked eye. In some immature fœtuses the mucoid tissue has undergone complete retrogression; whereas in others and in mature infants the process is still in progress. Hence the size of the cavum tympani is variable. An error is here

excluded which, according to Lesser, is possible when the method is employed of lifting off the tegmen tympani.

To conclude: the retrogression of the foetal mucoid tissue is intra-uterine, following laws of growth still unknown, and not in consequence of mechanical influences as Wreden, Wendt, and others infer, and the size of the cavum tympani does not allow a determination as to whether respiration has occurred before or after birth.

6. Has the character of the contents of the tympanum in the new-born a medico-legal value?

The answer is partly dependent on that of the fourth question. One would be led to believe that the finding of the gross particles, *i. e.*, vernix and meconium, would suggest intra-uterine respiration. It would naturally only hold for such cases in which drowning, after birth, in the amnion could be excluded. The finding of air in the middle ear of a fresh cadaver would be proof of respiration having occurred, either inside or outside of the respiratory passages.

Concerning the duration of life and of pulmonary respiration, all authors are agreed that the quantity of air in the tympanum gives no clue, as air can at times quickly, in other cases slowly, penetrate into the tympanum, and possibly may even be reabsorbed. The so frequent asphyxial hemorrhages deserve consideration. Both ears should always be investigated.

To return to the principal question, whether the finding of pus in the ear of the new-born depends on a bacterial process, the answer from an embryologic and pathologic standpoint must be a negative one, in accordance with the bacteriologic investigations of Gradenigo and Penzo. There is, therefore, no "otitis media neonatorum." The older statements of Zaufal, Schwartz, and Wendt, on intra-uterine inflammatory disease of the middle ear, with facial paralysis and perforation of the drum membrane, are no longer sound. Though the "pus" in the middle ear of the new-born cannot be accepted as the sign of an infectious otitis, the new proof for the old assertion is of value, that particles of the amnion and meconium can be found in the middle ear of the new-born in connection with intra-uterine respiratory move-

ments. I believe to have brought the further proof, that in the early months of foetal development, from the fourth month on, the amnion reaches the tympanum, but that the larger particles of vernix and meconium are introduced only by the respiratory movements occurring at the end of pregnancy, or at birth.

The contamination of the tympanum with amnion, whether it occurs early or late, is the cause of the collection of leucocytes in the cavum tympani. The so-called otitis media neonatorum is a suppuration due to foreign bodies.

The change which the mucous membrane suffers in this process, the filling up of the tympanum by nearly immovable masses, is certainly not immaterial for a disposition towards a bacterial disease, as Hartmann also emphasizes in a summary of the old Wendt reports. The proof must, however, be furnished by clinical, pathologic, and bacteriologic investigations of recognized cases of middle-ear inflammation in young children, with the frequent demonstration of the constituents of the amnion in the pus.

The severe hemorrhagic changes which the mucous membrane of the tympanum suffers in severe labors, with early respiratory movements, must be of some importance for a predisposition towards bacterial infection.

On account of some recent attempts to deny the occurrence of aseptic pus in the new-born, in conclusion, it must be once more emphasized that the finding of pus, a marked swelling and redness of the mucous membrane, with hemorrhages, in the new-born, and probably, also, in infants several days old, is absolutely no proof for an otitis of bacterial origin.

A REPORT OF SEVENTY-SEVEN RADICAL OPERATIONS.

BY DR. P. MANASSE AND DR. A. WINTERMANTEL.

FROM THE STRASSBURG UNIVERSITY EAR CLINIC.

Translated by Dr. ARNOLD H. KNAPP.

THIS is a report of the radical operations performed at our clinic during the last two years. It seemed to us of interest to add the experience gained therefrom, as the views on the indications for this operation are not the same, and because, as Passow states, with justice, at the present time a larger number of statistics are desirable to furnish proof on the line of after-treatment as we cannot decide the question of the shorter or longer course of treatment in the various methods.

As an introduction we wish to mention that unless a vital indication exists we have treated the chronic otorrhœas medicinally for a length of time, especially when the hearing was still relatively good. The acute cases were treated with the simple mastoid operation according to Schwartz. The radical method was reserved for the chronic cases, though it seems from Panzer's latest communications that subacute and even acute cases have been subjected to this procedure. A new method like the radical operation may thus be discredited by a too general application.

The best medicinal results in the chronic cases have been obtained by the regular employment of absolute alcohol, recommended by Politzer and others, to which corrosive sublimate, 1 to 1000, had been added. Ten to fifteen drops of this solution were dropped in the ear after thorough cleansing; the ear canal was then closed with cotton. Otor-

rhœas of years' standing, even combined with caries, were often healed in a short time, and in some cases the perforation even closed. Disagreeable effects, except pain on introduction, were not met with.

The indications for the radical operation may be stated as follows:

1. Intracranial complication, real or suspected.
2. Retro-auricular fistulæ and abscesses; gravitation abscesses of any variety.
3. Protrusion of the posterior and upper wall of canal.
4. Chronic otorrhœa, cholesteatoma of the middle-ear cavities, with or without caries, which resisted medicinal treatment for a length of time.

Our method of operating hardly differs from the usual. The operation is usually done according to Zaufal-Jansen's method; the Stacke method is only employed if the sinus is situated abnormally far forward. We generally use a hollow chisel about 15 *cm* long, with a flat curve and narrow handle; rarely the bone-forceps.

It was attempted in a few cases to retain the ossicles in place though our experience is too small to permit any judgment on this point. It would, however, not be out of place to continue this endeavor when the hearing is not greatly altered, and the attic and ossicles are not much involved.

The plastic was performed generally according to Jansen, in a few cases after Körner; recently in place of two flaps we have cut a flap out of the posterior wall in an upper or posterior direction according to the anatomical position.

The retro-auricular wound was always primarily closed with sutures when the soft tissues were healthy; in other cases, as in abscesses and fistulæ behind the ear, a part of the wound was left open. The wound was treated openly only when extensive caries of the labyrinth or intracranial complications were present.

The after-treatment of these operations is as important as the indication and technic. The first iodoform dressings remain in an afebrile case for six days; the sutures are then

removed and wound dressed with iodoform gauze through the ear canal. Three days later we commence with the moist dressings, and have found two-per-cent. solution of carbolic acid to be most serviceable. The wound is packed with sterile gauze dipped in this solution, a gauze compress moistened with the same solution is placed over the ear and covered with rubber tissue and a cambric bandage. This dressing is changed daily. Its application is especially to be recommended in purulent infiltration of the soft parts, in excessive discharge from the wound, and exaggerated formation of granulations. Unhealthy granulations, so usual with the dry dressings, did not appear with the moist dressings. Toward the end of the treatment we again return to dry gauze.

The age of our patients subjected to operation varied from two to fifty years. Thirty-six children below fifteen years were operated on. There were 46 males and 31 females.

Of these 77, 40 are healed, 21 still under treatment, and of 8 the final outcome cannot be stated. Healing occurred in the 40 cases in 713 weeks, an average of 17.8 weeks per case.

The functional result varied greatly, according to the destruction present. The function was made worse after the operation in only 1 case, no change in 6, improved in 17 cases. The improvement in hearing measured in the perception of whispered numbers varied from a few centimetres to fourteen metres.

The retro-auricular wound was closed primarily in 47 cases; primary union took place in 29 cases; secondary union in 18; the wound remained permanently open in 20 cases.

Perichondritis of the auricle was observed in 1 case. It was treated by incision and wet dressing, ran a protracted course, and healed finally with exfoliation of a part of the cartilage and considerable deformity of the auricle. New-formed drums, *i. e.*, membranes which closed off the tympanum from the remaining part of the wound, were observed in 5 cases. The formation of this membrane unquestionably interfered with the hearing.

Perisinuous abscesses were found in 2 cases; they occur

much more frequently in acute mastoiditis, as has been reported by others.

Fistulæ in the horizontal semicircular canal were encountered in 9 cases. The vertigo resulting from this complication usually disappeared on the healing of the wound.

An exostosis in the mastoid antrum was observed once. It was attached to the posterior wall with a broad base and protruded as a snow-white semi-round prominence.

Facial paralysis occurred 5 times after operation ; it disappeared again in a certain length of time except in 1 case. Deaths occurred in a comparatively large number of cases after the operation ; they were the result of the well-known complications.

A tabulated statement of these 77 cases, including length of treatment, functional results, and remarks, may be found in the German original, *Zeitschrift f. Ohrenheilkunde*, vol. xxxiv., pp. 16-23.

A NEW SYMPTOM OF OBSTRUCTIVE THROMBOSIS OF THE LATERAL SINUS.

BY DR. F. VOSS, RIGA.

Translated and Abridged by Dr. EDWIN M. COX, New York.

L EUTERT'S¹ schematic arrangement, aside from the fact that it ignores childhood, has the disadvantage of requiring "several days" to make the diagnosis of sinus thrombosis. Just how many days is not stated, but we gather from the text that three are required, and such delay may be dangerous. I have therefore looked for a symptom which may save this time and believe that I have found it. I use a stethoscope, on the principle that a normal unobstructed vessel, for instance, the internal jugular vein, gives a certain murmur which cannot occur if the vessel is obstructed. It is true, however, that this vascular murmur may be absent upon the normal side, but if such is the case we can cause an artificial murmur on that side. This is impossible in the case of an obstructed sinus. Investigation shows that the murmur is, ordinarily, uncertain in patients who are suffering from disease of the sinus, even upon the healthy side, possibly on account of the slowed blood current, when there is no sound on either side, or on account of the increased flow through the facial vein upon the diseased side, when there is no appreciable difference to be heard upon either side. If we place the stethoscope lightly upon the neck we hear the pulsations of the carotid, or if the heart is very strong we hear the sound made by the blood current in addition. If we gradually increase the pressure with the instrument, we hear the sound of the blood cur-

¹ *Arch. f. Ohrenheilk.*, Bd. xli., p. 215, 1896.

rent in the compressed jugular, and with further compression we hear sounds which with complete stopping of the blood current become like the first sound heard, the heart-beat in the carotid. Such strong pressure on a thrombosed vessel is dangerous and unnecessary. This continuous murmur in the jugular under the pressure of the stethoscope, if the vessel is normal, and its absence under other circumstances, is characteristic of sinus thrombosis. The best place to make the test is close to the base of the skull, and I have been able to demonstrate it a number of times at this spot. We use the stroke of the carotid as a guide, and must not press so hard that this is obliterated. It is also advisable to examine the patient both in the lying and standing positions, and we must allow the ear to become accustomed to the loud tracheal rales. Cases of this condition are not very common, but in two cases in children I was able to demonstrate the symptom on the right side and in each case the thrombus was found. Some further observations upon adults show that the symptom is regularly present. Absence of the murmur above and its presence in the middle of the neck may be explained by the condition of the facial vein. The instrument used was an ordinary stethoscope, and in my hands nothing was gained by the phonendoscope. In 1897 I was able to demonstrate this symptom in two children before the Society of Practising Physicians at Riga.

ACUTE BILATERAL BRAIN ABSCESS AFTER OPENING THE MASTOID—RECOVERY.

BY DR. H. SELIGMAN, FRANKFORT-A.-M.

Translated and Abridged by Dr. EDWIN M. COX, New York.

THE following is an account of an acute, evidently double brain abscess which followed the operation of opening the mastoid :

G. A., male, æt. twenty-two, had purulent otitis on left side from childhood. Membrana destroyed, and malleus absent, having been removed several years ago. Operation April 14, 1897. Periosteum adherent, bone dense. Antrum full of granulations and foul pus. The main point of caries appeared in the roof of the mastoid antrum, which was thin and had to be removed entirely. Tegmen tympani and wall of labyrinth healthy. Three days after operation, patient vomited, spoke imperfectly, and became comatose for a time. Soon after recovery from the coma he began to have severe headache. Temperature, 38.3 C., pulse 72, occasionally irregular. Next day, dressing dry, headache worse, pulse a little slower, and patient somnolent, and during the night severe vomiting. On fifth day, pulse 60, skin reflexes increased, and patient constipated. On sixth day there was a small amount of fetid pus discharged from the auditory canal. Temperature somewhat elevated, higher at night. On the seventh day the signs of brain compression were more marked. General strength good.

The above symptoms can be considered as due to brain irritation from infection in the neighboring temporal bone, carried through the opening in the tegmen antri, which has been mentioned, and through the labyrinth. By the prompt result of Weber's test in the positive sense (the tuning-fork

was lateralized to the affected ear), the labyrinth could be excluded as healthy; consequently the infection must have gone through the tegmen antri. The symptoms of brain irritation could have been caused, in the absence of pyæmic signs and cerebellar symptoms, either by abscess or meningitis. Lumbar puncture, however, brought no fluid, and we consequently made a diagnosis of cerebral abscess, most likely in the left temporo-sphenoidal lobe.

On the eighth day a second operation, under chloroform, was done. The cranium was opened with the mallet and chisel just above the meatus, in the squamous portion of the temporal, and the unpulsating dura was cut, revealing a normal and very dry pia. A needle was introduced into the brain, inwards and upwards, and at a depth of three *cm* drew pus. The cavity from which this came was opened along the needle, and its fetid contents washed out. After narcosis, pulse 72, temperature 37.4, and headache.

On the ninth day the headache was increasing, and on the following three days the condition gradually became a little worse, and the headache a little greater. No choked-disk.

On the thirteenth day were the first signs of paraphasia, and on the next day he was aphasic (amnesic). He answered questions, but could not name objects either on sight or from memory. There was hyperæsthesia in the legs. From these symptoms it was evident that there must be another abscess, probably near the first one, and on the fifteenth day an osteoplastic resection was done, after the aspirating needle had been used in various directions without result, but nothing was discovered. The patient was not improved by the operation, but he remained conscious. When he was moved he complained of pain in the gluteal regions, but there was no local tenderness. He was constipated, the aphasia continued, he had hiccoughs, and tremor developed in the left arm.

On the seventeenth day his temperature suddenly rose to 39.1, his pulse remained slow (64), and his constitutional symptoms increased.

On the eighteenth day his pulse rose to 100 and was weak, soft, and regular; in fact, tension had disappeared. I feared the rupture of an abscess into a ventricle, but the patient was not collapsed. The dressing contained an increased amount of pus of

the same fetid odor, and I therefore judged that a second abscess had opened into the first and was discharging through it.

The patient's general condition after this slowly improved and the discharge diminished. There still persisted an evening rise of temperature, and it was only on the twenty-first day that the muscular twitching ceased. On the thirty-sixth day the patient left his bed, but there was a discharge of pus for some time after this. The pain in the glutei seemed to have been due to abnormal reflex irritability, and was rather slow in disappearing.

ADDITIONAL CASES OF ACUTE OSTEOMYELITIS OF THE UPPER JAW IN INFANTS.¹

By DR. RÖPKE, SOLINGEN.

Translated and Abridged by Dr. J. GUTTMAN.

IN his work on acute osteomyelitis of the upper jaw (*Festschrift des Archivs für Laryngologie*) Schmiegelow described in detail a case which had come under his own observation. He found two other cases recorded which he regards as acute osteomyelitis, although the reporters of the cases did not diagnose them as such.

One of these cases (recorded by Grandidier) occurred in a six-weeks-old infant, which, without any previous ailment, suddenly became sick with an acute inflammation of the right superior maxillary bone. The right cheek and nasal region were greatly swollen, the eye was œdematous, the hard palate on the right side was bulging, and after the dental buds fell out there was an escape of foul-smelling pus from the alveolus. Fourteen days later the child died. The autopsy revealed a total necrosis of the right superior maxilla. Grandidier ventured the opinion that the case was one of phosphorus necrosis.

The second case, reported by Rudaux, occurred in an infant three weeks old. The eyelids became red and œdematous; there was swelling of the infraorbital region, and then a quantity of pus escaped under the left eyelid, and later also from the left nostril.

In 1893 Schmiegelow himself treated a four-year-old child, which at the age of ten weeks, without any previous illness, suddenly became sick with fever, convulsions, and after a few days, great swelling of the entire right superior maxillary bone. According to the report of the attending physician this was followed

¹ Read before the Society of West German Rhinologists and Otologists, Nov. 7, 1897.

by a discharge of pus in the region of the canine tooth. Subsequent to a discharge of pus from the right nostril there was a marked abatement of all the symptoms, but the discharge of pus persisted, and from time to time smaller or larger sequestra were discharged. When Schmiegelow saw the child (four years after the onset of the disease), he found a periosteal swelling of the processus alveolaris and destruction of the lateral nasal wall.

Since then I found another case, published by Greidenberg in 1896, which I also consider as one of primary osteomyelitis. It occurred in a three-weeks-old infant, which suddenly became sick with fever, swelling under the left eye and of the alveolar process, and a discharge of pus from the left nostril. An abscess under the left eyelid was opened and the anterior wall of the superior maxilla and the processus alveolaris found to be necrotic. From time to time there were removed several sequestra.

I may record two other cases of this condition, which came under my care on the same day, January 15, 1897.

CASE I.—The male infant of a grinder, K., was well during the first week of its life, but in the beginning of the second week did not take the breast well and cried much. Then the parents noticed a swelling of the left cheek and a discharge of pus from the left nostril. The next day, observing a swelling also of the left eye, the parents called in their attending physician, who referred the case to me.

The child was brought to me on the fourteenth day of its age. The father asserted that he and his wife were always healthy; his three other children were never sick; the child preceding the patient was a still-birth.

The little patient is poorly nourished and has no eruptions on the body. The left cheek and the region about the left eye are very much reddened and swollen, and from the left nostril there is a flow of foul-smelling pus. The left half of the hard palate is bulging, and pus is discharging from several fistula. In the fossa canina there is a fistula from which granulations protrude. Probing of the fistula reveals extensive caries of the hard palate. The crown of the molar tooth lies loose in the granulations of the alveolar process. The probe encounters necrotic bone in every direction. The granulations are carefully removed with a sharp spoon, then the cavity is irrigated, and in the irrigating fluid are to be found several small sequestra. The cavity is tamponed

with iodoform gauze. The parents are instructed to clean the left nostril and the mouth every hour. Temperature 39.7° . The child is seen daily and tamponed.

On *January 18th.*—Temperature normal, the child can open the left eye, takes the breast better, and does not cry so much.

January 20th.—Disturbances of digestion sets in, great swelling of the infraorbital region; the discharge from the left nostril is more copious than it was previously. The irrigating fluid flows from the wound through the left nostril. The hard palate is less swollen, slight secretion from the small fistula.

January 21st.—The child is very restless; opening of an abscess in the infraorbital region. With the probe in the abscess cavity we can feel necrosis of the frontal process and of the lower orbital wall.

January 23d.—The crown of the canine tooth is in the irrigating fluid.

January 24th.—Much diarrhoea; no fever; discharge from the nostril ceased.

On the following days the child becomes steadily weaker, secretion from the fistula is comparatively slight.

January 31st.—Broncho-pneumonia.

February 1st.—Exitus in the morning.

CASE 2.—The child of a merchant, S., seven months old, strong boy, parents healthy, never sick till now, becomes sick with fever and marked swelling of the left upper jaw. The attending physician opens an abscess over the region of the left molar tooth, which lies adjacent to the abscess cavity. As the condition of the child does not improve, and whereas the swelling under the left eye increases so much that the child can no longer open its eye, another physician is called in, who suggests that I be called in consultation.

I found a swelling of the hard palate extending to the median line, and of the alveolar process on the left side; a small fistula in the canine fossa from which there was a flow of foul-smelling pus. The left nostril is also full of pus, the lateral nasal wall carious. The eyelids are œdematous in the left infraorbital region, and in the region of the zygomatic arch great swelling without fluctuation; temperature, 39.5° .

We decided to create an outlet for the free evacuation of pus from the canine fossa. I cut through the mucous membrane and the periosteum on both sides extending from the existing fistula

in the canine fossa; scraped the periosteum upward. In doing this the scraper went through the anterior wall of the antrum into a large bony cavity. Digital examination disclosed destruction of the anterior wall of the upper maxilla and necrosis of the lower orbital wall; a large sequestrum was separated from the processus jugalis and removed with the finger. Careful cleansing of the large wound cavity and tamponing with iodoform gauze.

The child was taken into the clinic. Temperature in the evening 38.5° . On the following days daily dressing, copious secretion from the wound cavity. There is no more flow of pus from the left nostril, the swelling of the hard palate and lower lid are less, and the child can again open its eye.

On January 25th the child is free from fever, is discharged from the clinic, and the mother is instructed to cleanse the wound cavity every day. The child is brought to the clinic once a week, when several sequestra are removed. The condition of the child is continuously good.

April 20th.—Child is brought the last time. There exists still a small fistula, the lower part of the cheek is somewhat sunken; no swelling or sensitiveness to pressure anywhere.

On the first of May the parents moved away. The father informed me by mail that there still exists a fistula, and that small sequestra are now and then discharged. The child, according to the father's statement, is looking perfectly well, and there is no real disfigurement, notwithstanding the slight falling in of the left cheek.

There is hardly any doubt that in both cases we had to deal with an acute primary osteomyelitis. I naturally investigated the cases for the existence of lues, but careful examination of the parents and of the child gave no evidence of this; the subsequent course of the disease also pointed to an acute osteomyelitis.

A careful perusal of the histories of the patients shows that all the six cases closely resemble each other. The disease occurs in infants who were previously healthy, became sick with fever, swelling of the upper maxilla, a discharge of pus on one or the other side, extensive necrosis, which is limited to the maxillary bone.

Regarding the treatment I agree with Schmiegelow that we should not proceed too radically. The result of the

conservative treatment is that we avoid bad disfigurement, even though the process continues for months or years. The younger the children the more unfavorable is the prognosis. The hard palate is also liable to be affected. The children then cannot drink, and their nutrition suffers. The pus is swallowed and causes digestive disturbances. It is therefore of the greatest importance in small children to cleanse the nose and the mouth carefully of the foul-smelling pus.

THE EFFECT OF ARTILLERY PRACTICE ON THE EARS.

BY DR. RICHARD MÜLLER, BERLIN.

Translated and abridged by Dr. J. A. SPALDING, Portland, Me.

HAVING been interested in a case in which a workman suffered injury to his ears by long-continued rifle firing, I took an opportunity to be present at some artillery exercises, for the purpose of investigating the effect of repeated detonations of heavy guns upon the ears of officers and privates.

The firing on the first and second days was from 9-*cm* bronze field-pieces loaded with 1.6 *kg* of laminated smokeless powder, and with a very shrill, short, high-pitched report.

I did not get a chance to examine any soldiers exposed to the firing on the first day, but I occupied myself with investigations of a general character. On the second day I examined 21 privates who had been exposed to the concussions from 90 rounds. On the third day the 12-*cm* pieces, with 1.4 *kg* of smokeless laminated powder, and 70 rounds were fired, and in a second battery the 15-*cm* nickel-steel guns with a load of 4 *kg* of smokeless powder and 50 rounds. From these batteries 30 men were examined.

Although these pieces are not of the largest calibre, yet they are, so far as the report is concerned, not less powerful than the very heaviest mortars, as I was assured by the officer in charge. In point of fact, as I convinced myself from the centre of the battery, the noise from the six large guns fired like a salvo is indescribably tremendous, ear-splitting, and unique. The laminated smokeless powder

is three times as powerful as the old-fashioned granulated black powder, but since about the same weight of the new is used as of the old, one may get some idea of the force of the detonations.

It is one of the regulations of artillery practice that all privates *must wear cotton in the ears* during firing, whilst the officers are cautioned to close theirs with their hands. It would have been more advantageous for my investigations if the privates could have been directly exposed to the concussions of the guns, but the regulations are distinct against the least exposure of the ears, and for that reason rupture of the *Mt* is very rare.

During the first two days the men stood moderately close to the guns, but on the third day they concealed themselves behind a breastwork after loading and then fired the guns with a lanyard. This method was taken to avoid any premature explosion of shells, used only on this day. I was rather afraid that the diminution in sound produced by the distance of the men during this form of firing (3 to 5 metres) would negative my results, but nevertheless the concussions were still violent and the results on the ear about the same as in the men who stood close to the guns on previous days.

It was impossible amid so much confusion *to make any manometric tests of pressure in the ears*, but that the latter must have been well marked was proved by the fact that in one instance a plug of cerumen, which had given no trouble before the firing, immediately after produced a high degree of deafness from being propelled against the *Mt* by the force of the detonation.

The investigations that I made on 51 men, mostly privates, but including some subalterns and a few officers, consisted in examining the ears *before the firing*, placing the results in a book, and then making similar examinations *afterwards*. This step involved double examinations of the men, but was the only way in which to determine accurately the alterations due exclusively to the firing.

I tested in a room 8.60 *m* long, 3.55 *m* high, and 7.8 *m* wide:

1. The objective condition of the meatus and *Mt*;

2. The duration of the c fork (128 vibrations) from the vertex;

3. Aërial conduction for C_2 (G_2) as well as for a'' ;

4. The hearing for the whispered voice.

Although many points were necessarily left untouched, owing to the difference between testing patients in one's own office with all desired apparatus at hand, and in a place where men were constantly coming and going, and, although there was some haste owing to the need of not keeping the privates too long from their duties, yet I am quite sure that sufficient time for accurate observation was given for every man.

Out of 102 ears at my disposal 6 were occluded with cerumen before the firing so that a satisfactory examination of the *Mt* could not be made. Syringing would have taken too long, and, as the parts would have been so much altered so far as congestion was concerned that it would have been difficult to decide to which to ascribe the conditions after the firing (to the syringing or to the concussions), all manipulation was abandoned and the 6 were excluded.

Of the remaining 96 ears only 34 could be considered as normal before the firing; the remainder exhibiting slight alterations, such as abnormal position of the manubrium and retraction of the *Mt* generally slight, but occasionally marked. In others there was more or less dullness of color, absence of the light-spot, opacities, calcareous deposits, slight vascular injection, especially of the vessels of the hammer, and cicatrices. In no case was there any defect visible in the *Mt*, nor any middle-ear suppuration. Nine privates showed slight injection of the meatus with diffuse redness of its surface, and in two instances this congestion could be traced back to the *Mt*.

The appearances in the Mt were the same after the firing as before in 52 ears, but we must not forget that there might have been more changes if the cotton had been omitted. The remaining 44 ears showed *distinct vascular congestion* despite the cotton, a condition due to the firing alone, because these men were not exposed to any other external influence than the firing. All of these 44 showed increased

blood-supply, partly in the shape of diffuse and intense redness at the end of the meatus and periphery of the *Mt*, so that the boundary line between the two regions could not be distinguished, and partly in diffuse redness of the *Mt* alone. Other cases exhibited congestion of a single vessel on the manubrium with branches towards the meatus. Or without any connection with the hammer vessels minute capillaries could be seen in the margin of the *Mt*, running toward the umbo.

The intensity of the congestion varied, being moderate in two thirds of the cases, and extreme in the rest, but even when most marked the hyperæmia was never enough to cause the entire membrane to appear entirely red, for in every instance some normal color could be seen through the injected districts.

Extravasations of blood were seen in seven men, and always in ears which showed the most hyperæmia. The extravasations were always multiple, stippled, minute, occasionally in the upper segment, and once I saw a large bluish-red sugillation, the size of a bean, just below the umbo, and pushing forward the epidermic layer like a shiny blister. The case was noted before the firing as one of marked retraction of the *Mt*, but despite the extravasation, the hearing for even a whispered voice was good, there were no subjective complaints, nor was the man aware of any painful sensation at the time except that directly after one concussion he thought that he perceived a disagreeable sensation in the ear.

No case of *rupture of the Mt* occurred during the firing practice, which may have been due to the use of the cotton plug. Nor were there other objective appearances in the entire list, otherwise than before mentioned, except that in one man with slight retraction before the detonations there was observed afterward an appearance as if a portion of the *Mt* had been pressed like a disc against the promontory, presumably an old cicatrix.

It is worth observing, that ears found normal before the firing were almost always normal afterward. In only three of such cases could slight injection of the ossicles be

seen. Therefore we may assert that alterations seen after the firing occurred chiefly in ears that were not normal before. In other words, out of 62 ears abnormal before the firing, 41 showed increased abnormalities afterward. Ears with slight retraction before the firing and slight injection, were more hyperæmic after, which is probably due to the greater original tension of the retracted *Mt*. Consequently variations of pressure on the *Mt* from detonations produce more marked results on a membrane abnormally tightened than on one of normal tension, which can the more readily accommodate itself to varying degrees of pressure. The increased blood-supply is, as in cases of the skin reddened by rubbing, to be looked for as a local effect upon the parts affected. The process here is analogous to the vascular injection and extravasations seen after forcible massage of the *Mt*.¹

The duration of perception for the c fork from the vertex (normal ear 20 to 22 seconds) was abbreviated in 40 men, but Rinné's test was always positive. In 11 privates the duration of perception was as long as or longer after the firing than before. Possibly the fork was struck with greater force when these men were examined, or they paid greater attention, or greater quiet then prevailed, so that the difference may be accounted for in that way. The same sources of error may be suggested for several men who exhibited a shortened duration of perception afterward in comparison with that before. But after all is said to account for variations in the results of the tuning-fork examinations, there can be no doubt *that repeated violent detonations of artillery abbreviate the perception by bone conduction*, owing to over-irritation and subsequent exhaustion of the nervous portions of the ear.

The abbreviation of perception varied from one to sixteen seconds, but there was no proportional difference in the abbreviation between normal and abnormal ears. There were men with normal ears who showed excessive abbreviation of the duration of perception, and again men with marked retraction and hyperæmia who showed no abbreviation at

¹ Ostmann, *Archiv. f. Ohrenhklde.*, Band 44, p. 228.

all. So that it was impossible to prove that the amount of abbreviation depended in the least on the original objective appearances of the *Mt*.

The tests with the tuning-forks $C_2(G_2)$ and a^{II} by aerial conduction agreed identically with those obtained before the firing, so that we may conclude that the field for tones was not contracted by the detonations. I think, however, that this result is rather inaccurate, because it is remarkable that every soldier should have perceived the C_2 fork, and I feel that many soldiers without a musical ear confused the perception of the tone with the sensation of aerial vibration arising from the fork. Furthermore to test the upper registers with only the a^{II} fork does not enable us to assert positively that no contraction upward has occurred. I used at first a Galton whistle, but when some soldiers persisted in perceiving tones which I myself with normal hearing could not hear, I gave it up and employed the highest fork available, inefficient though it was for testing the highest registers.

Although I was unable to prove any diminution in the quality of the hearing after the firing, the tests for duration showed quantitative reduction in many instances. The smallness of the room in which the whispered voice was tested makes my results somewhat defective, for if I had had a space more quiet and more capacious there can be no doubt that a greater reduction of perception after the firing would have been discovered than was actually the case. Hence I do not lay much stress on the latter results. But I will say that 26 ears showed reduction for whispered voice, the maximum being about 4 *m*. Most of these ears had reduced perception before the firing began, and every one exhibited retraction of the *Mt*. Furthermore, the amount of retraction corresponded substantially with the hyperæmia observed after firing had ceased.

Very few complaints of tinnitus, vertigo, or headache were made after firing. Four men alone spoke of a roaring in the head, and one mentioned that he had often suffered from dizziness after practice, but on that day he had felt no sensations at all.

I was unable to tell how long the alterations noted in these examinations persisted, but judging from the fact that very few privates are invalidated after two years of service, one can see that very little permanent injury follows ordinary artillery practice. In officers and some subalterns, however, who are exposed to such detonations year after year, permanent disturbances, such as partial deafness and tinnitus, are often observed. The treatment employed—baths, catheterization, sudorifics, pneumatic massage, cimicifugin, and neurosin (a compound of nitroglycerin and caffeine)—is generally of no avail except in occasionally reducing the tinnitus. Careful examination of all the officers and others permanently affected as a result of exposure to the detonations of heavy artillery revealed retraction and opacities in the *Mt*, *from which we draw the conclusion that violent detonations of heavy artillery on ears protected by cotton plugs only (or preferably) produce permanent injury to the hearing when the ear has been to some degree abnormal before the exposure.* This may be explained by assuming that the auditory nerve in an ear with retracted *Mt* remains permanently in a condition of increased tension or increased nerve-tonus, so that when exposed to violent concussions it is less capable of resistance than the less tense nerve of a healthy ear.

Moreover, when the *Mt* is constantly retracted the intralabyrinthine pressure is increased, and the nerve terminations thus permanently subjected to this increased tension are more powerfully affected by the pressure which follows detonations than when the permanent tension is normal.

Finally, we must not forget that the dampening action of the chain of ossicles in the normal ear is lost, or at least much reduced, during morbid processes in the middle ear, so that noise passes unsoftened and undampened to the labyrinthine structures.

From a practical point of view, we learn from these examinations that violent detonations of heavy artillery do greater and more permanent harm to ears with retracted *Mt* and middle-ear catarrh than to ears that are healthy. Without knowledge of this sort we might be inclined in cases for pension and damages to refer some slight affections of hearing

to visible alterations in the *Mt* and middle ear, and so to reject the claims of the injured person on the ground that the objective alterations were present before the injury occurred. But in my opinion we ought rather to see in these alterations an argument in support of the theory that it was the injury that produced the permanent deafness or even increased it, presuming of course that all the other symptoms coming into consideration coincide.¹

From a military point of view we learn that, aside from abnormal occurrences, permanent injury to ears that are not exactly normal is only likely to occur as the result of *prolonged and repeated exposure to the detonations of heavy artillery*. Therefore privates and others with but slight abnormalities in the ears, and in so far as they are not otherwise incapacitated for active service, can unhesitatingly be employed for two years' service in the heavy artillery, but, on the contrary, subalterns and young officers with ears at all diseased should be removed from such service, and workmen with similar slight alterations in the organs of hearing should be urged to avoid noisy trades or occupations.

¹ For further details on this subject see *Charité Annalen*, Bd. xxiii., p. 505
"Diagnosis of Traumatic Affections of the Inner Ear."

COMPLICATIONS FOLLOWING INTRANASAL OPERATIONS.

BY DR. EDMUND WERTHEIM, Breslau.

Translated by Dr. MAX TOEPLITZ, New York.

THE dangers from intranasal operations are frequently exaggerated. They appear to be much greater than they really are, since the nose is freely accessible to aërial microbes which, when present, are difficult to reach, and since antiseptic remedies of sufficient concentration cannot be applied to the nasal mucous membrane. It is, therefore, not to be wondered at that nasal operations are frequently considered to be the cause of pyæmic affections. Statistics do not agree with this view, which is also in contradiction with our own experience, that infections following nasal operations are the exceptions. For their production, particular predisposing conditions must be present. If, in spite of the occurrence of facultative pyogenic and ordinary pus-producing micro-organisms in the nose, infection does not take place upon directly accessible wounds, protective arrangements must exist which arrest their development. This view is also confirmed by experiments, apart from clinical experience on the harmlessness of extensive lesions of the nasal epithelium.

Investigations made by Dr. Brieger, some time ago at our clinic, have demonstrated that the number of bacteria in the different portions of the nose vastly differs. The largest number of bacteria, of course, is found in the path of the inspiratory current. However, in accordance with the results of St. Clair Thompson and Piaget, more detailed experience, which is not entirely complete, has shown that

a certain auto-cleansing takes place within the nose, the number of bacteria capable of development being the smaller, the deeper the nasal portions are located from which they are taken. Former investigations prove the occurrence of numerous bacteria of different varieties in the nose, which partly exhibit full virulence in experiments upon animals. If they remain harmless, in spite of their opportunities to enter the body through open wounds, we are justified in concluding that the bacteria invading the nose experience a diminution of their virulence under normal conditions in contact with the mucous membrane, and that this is accomplished by protective arrangements.

This protection is so extensive as to completely compensate the loss of a portion of nasal mucous membrane, and excluded by operation, to prevent the development of the bacteria. This faculty is restrained to certain limits. If too extensive portions of the nose are simultaneously incapacitated, the defensive forces become insufficient and infection takes place. The protective agent has not, as yet, been found. Wurtz and Lermoyez have, on account of experiments, assigned to the nasal mucus a bactericidal force.

This hypothesis, which is also supported among others by Piaget, is generally not indisputably proven by the experiments communicated by the authors. If the nasal mucus, viz., the secretions produced by the goblet cells and serous glands, were really the cause of the bactericidal conditions in the nose, why is a much larger number of bacteria found in the most anterior portions of the nose than in the deeper portions? Just in the most anterior portions the micro-organisms of the nose are readily developed with the assistance of traumata, which pave the way for the invasion. It has been of late more and more recognized that the door for infections of different kinds—lupus, lepra, etc.—is here situated.

In ozæna, in which the discharge of fluid mucus, owing to the absence of the action of nasal glands, is essentially diminished, particularly favorable conditions for infection ought to prevail, provided the hypothesis of Wurtz and Lermoyez were correct. However, just here a particular re-

sistance against infection of another kind is present, due to the metaplasia of the epithelium.

The bactericidal qualities of nasal secretions, except in experiments with the anthrax bacillus, have not been positively proven. Analogous experiments with those of Wurtz and Lermoyez did not give constant results. The reaction of the nutrient medium may have been influenced by admixture of the nasal secretions.

The best proof of the intranasal anti-bacterial action being exclusively associated with the nasal discharge would be furnished, if the secretions would extranasally influence the development of their own intranasal microbes. Experiments, therefore, were made in the following manner: nasal secretions of healthy individuals, after disinfection of the vestibule, were directly blown upon agar plates, or upon agar placed obliquely into wide glasses. In all cases more or less numerous colonies of cocci and bacilli of various kinds developed. In a further series of experiments, mucus from positively normal noses was blown into especially prepared wide glasses with bouillon. In two cases only the nutrient fluid remained sterile. In all other cases, upon agar plates made from the bouillon kept in the thermostat mixed with the nasal secretions during different periods, numerous colonies of staphylococci, streptococci, diplococci, and different bacilli developed.

These experiments, which are not quite indisputable, tend to show that the nasal secretions do not possess permanent bactericidal qualities, which, while acting intranasally, do not act extranasally, and are dependent upon other agents, as yet not known, at any rate, of mechanical action.

Intranasal microbes may as readily escape from the nose as they enter it. The time for settling in the nose and for becoming infective may be too brief. This possibility is pointed out by Flügge, in his paper on "Aërial Infection," in discussing the causes of failure in experiments upon animals by inhalation of dry, scattered, phthisical sputa. In violent expirations, blowing the nose, sneezing, etc., numerous microbes are thrown out of the nose, which lessen the

number of the microbes originally present. The protective action of lymphocytes emigrating from the nasal mucous membrane may also play an important part in the diminution of the virulence of the microbes immigrating into the nose.

If the natural protective arrangement of the nose become insufficient, infection takes place, or rather not a genuine infection, but different morbid processes develop, according to the mode of propagation of the microbes, apart from differences which may be due to the heterogeneousness of the causative agents.

They may be :

(1) local, limited to the region of operation or its immediate surroundings, due to direct invasion of the microbes ; or

(2) general, viz. :

(a) due to transmission in the lymph paths ; angina.

(b) caused by propagation through the circulation ; by emboli.

The main disease of the local processes, rhinitis fibrinosa, may develop from a specific infection due to Loeffler's bacillus. The following observation proves the fact, that diphtheria bacilli existing in the nose may further develop and produce the typical picture of rhinitis fibrinosa, even in cases in which a very small lesion of the epithelium was artificially made :

A child, three years old, is brought to the dispensary, on account of severe epistaxis. The bleeding spot of the nasal floor is cauterized. Owing to the restlessness of the child the cauterization became more diffuse than it was intended. After two days, pseudo-membranes presented themselves in the left (cauterized) nostril, from which pure cultures of Loeffler's bacillus were made. The course was extremely mild. Recovery took place after a few days under a spray of peroxide of hydrogen and powder treatment.

Even non-specific, simple pyogenic infections may produce general symptoms with local formation of pseudo-membranes, which may long persist under certain conditions. In this respect a case observed in our department was most

pronounced, in which, after galvano-cautery of the left lower turbinated body for twenty-two days, pseudo-membranes formed over and over again, and, in addition, during this entire period, fever up to 39° , occurred mostly in the morning, with irregular remissions.

These complications after endonasal operations are the exception, but in some individuals are the rule, so as to cause the belief in individual predisposition. In one and the same individual, *e. g.*, after the first cauterization, made *lege artis*, a severe angina, with serious general infection, occurred; after the second cauterization an otitis media, followed by empyema of the mastoid antrum, which had to be opened by chiselling; and also after the third cauterization, performed very carefully and limited to a small area, marked toxic general symptoms appeared, with moderate fever. This predisposition was due to local conditions, extreme nasal obstruction impeding the passage of the air current, whereby the invasion and development of the microbes were probably favored.

The accidental presence of an acute inflammatory process in the nose at the time of operation as a predisposing cause is illustrated by the following case:

In August, a patient, who had suffered from a cold, which had not been noticed and was not mentioned, was treated for epistaxis with the galvano-cautery. During the following night, chills, high fever, and general prostration set in, followed by acute inflammation of the mucous membrane of the entire nose, and also that of the antrum maxillare and frontale of the corresponding side, with typical clinical symptoms (and positive result of transillumination). Rapid spontaneous recovery under indifferent treatment took place. Headache and aprosexia persisted for some time, but completely disappeared during the patient's stay at the mountains.

The local disposition to infection is frequently increased by therapeutic measures, the most dangerous of which is nasal plugging. In several autopsies it was regularly ascertained that in every case of severe epistaxis blood usually enters the middle ear through the Eustachian tube, or the nasal acces-

sory cavities directly. Plugging favors the suppuration of these extravasations. It is well known that plugging may be followed by suppurations of the middle ear with subsequent empyema of the mastoid antrum. According to the hypothesis of Wurtz and Lermoyez, one could explain the injury done by plugging by the continuous imbibition of the bactericidal nasal mucus, instead of (as it is mostly done) by stagnation of the secretions, which is quite abundant after plugging.

Nasal irrigations, unsuitably carried out, may produce aural disease; the complications, however, in quite a considerable percentage of cases, are not due directly to the operative procedure, but to apparently accessory circumstances during the after-treatment.

Among the endonasal operations proper, the galvano-cautery is much more frequently associated with complications than cutting operations. By means of "distant action" the protective arrangement in the nose is more readily rendered insufficient. According to B. Fraenkel an angina following endonasal operation is not unfrequently propagated through the lymph channels. However, in some cases, palpation of the naso-pharynx has been the cause of the subsequent angina, and in others, an extensive reactive inflammation might have followed the endonasal operation, which produces interstices in the epithelium by the increase of emigrating leucocytes from the tonsil, thus furnishing an entrance for the microbes upon the surface of the tonsils. Against the latter view stands B. Fraenkel's doubt of the small etiological importance, for the development of infections, of these interstices in the epithelium, with their current of leucocytes directed outward. Fraenkel's hypothesis is supported by the comparative frequency of angina as sequel to operations, and by the rareness of complication in regions, the relations of which with the lymph channels of the nose are more exactly known, as, *e. g.*, in the meninges. Moreover, at other places of the lymphatic ring with the same opportunities for the entrance of microbes, such infections are just as rare as swellings of the deeper cervical glands which partly derive their supply from the nasal cavity.

The connection with the endonasal operation is left beyond doubt if it is immediately followed by embolic processes. Metastatic suppurations after nasal operations, as a rule, are genetically associated with sinus phlebitis, transmitting the embolic extension. Here, rather than in otitic pyæmia, embolic processes or metastatic suppurations, respectively, if the emboli carried away from the nasal blood channels were of an infectious character, may directly originate from the nasal blood cavities. This view is strengthened by the following observation, in which, after the removal of the posterior extremity of the turbinated body, hemorrhagic infarction of the kidney took place:

History: Patient, æt. twenty-four, who has never been sick before, suffers for years from nasal obstruction, and is sent by his family physician to the dispensary with the diagnosis of "nasal polypi."

Examination: Both nostrils entirely impassable for air. Left cavity is completely filled to the vestibule by a mucous polypus. Right cavity is not as completely filled, but just as impervious. The polypi originate from the middle turbinal and the lateral nasal wall. Rhinoscopia posterior presents enormous posterior extremities of the turbinals in polypoid degeneration.

Numerous polypi at first are removed from the nose with the cold snare. On the following day, July 18th, removal of the posterior extremities of both lower turbinals with the cold snare. On July 19th, extraction of several polypi. In the afternoon, temp. 38.2° , rising rapidly to 40.1° with a chill. July 20th, temp. 38.4° . The urine looks in the morning dark red and sanguineous. Microscopically numerous red blood corpuscles are found, kidney epithelia and hyaline casts are sparse, but many granular casts consisting of kidney epithelia and erythrocytes. Albumen confirmed by the test with acetic acid and ferro-cyankalium. Heller's test quite positive.

No suppuration in the nose. Spleen enlarged and palpable. Right kidney region sensitive on pressure July 22d. Amount of urine, 1500 *ccm.* Spec. gravity, 1015. No sugar; color somewhat brighter; intense dulness upon boiling. Much sediment. July 30th, no fever. Urine still contains small traces of albumen.

In this case, the typical renal infarction is directly due to endonasal operation. During the hemorrhage post opera-

tionem, a thrombus formed in one of the nasal veins, and when detached passed with the venous current through the facial veins to the internal jugular, anonyma, and cava superior into the right heart chamber, and thence into the large circulation until it was caught in the kidney, and here caused the infarction. If this reasoning is true, the foramen ovale was supposed to be open, which does not unfrequently occur.

With some hesitation, however, another observation is reported, which is to be considered as an example of pulmonary infarction following an operation for nasal polypi, and is now briefly given with its most important details, as follows:

History: Patient, æt. forty-four, had a large number of nasal polypi removed on January 29th and 30th, with the cold snare at the dispensary. Hemorrhage. Plugging. On January 30th, towards evening patient was seized with chill, violent cough, and severe stinging pain at the side of the chest. On January 31st, he was admitted to the hospital. Examination: Temp. 38.7° ; pulse 96, regular and quite full; 24 respirations. Patient complains of headaches and stinging pain in the right side, which is increased with deep inspiration and cough, the latter being rough in attacks and dry. The sputum is quite profuse, moderately viscid, markedly hemorrhagic, and contains staphylococci and a few diplococci, but no typical Fraenkel's pneumococci nor Friedlaender's pneumobacilli. Lungs: Percussion R. backward and below, in a small circumscribed area slight dulness. Auscultation: Friction at the same place; isolated large rhonchi; voice fremitus not weakened; no bronchophonia. February 1st, fall of temperature in the morning to 37.3° , in the afternoon rising to 38.2° . February 2d, temperature falls in the forenoon to 36.4° . Daily maximum 37.4° . Subjective condition improved. February 3d, in the afternoon, sudden rise of temperature to 40.1° . Intense stinging pain in the side; cough; while the temperatures on February 4th and 5th are still above 40° , it falls on February 6th to 37.8° and then remains normal.

The diagnosis of pulmonary infarction is not absolutely free from objection. A pleuro-pneumonia could not be positively excluded. However, the slight result of the

physical examination, the coincidence with the operation, the sudden rise of temperature after it, and the condition of the sputum favor the diagnosis of an embolic pulmonary process. The second rise of temperature means another embolism. The thrombus had been carried from the nose to the vena cava superior, the right heart, and the lungs, where it stuck and produced a pulmonary infarction.

These thrombi of the cavernous cavities of the turbinals, which are frequently quite extensive, may pass the pulmonary arteries and thus enter the left heart and the large circulation. If infectious, they may, even without the connecting link of phlebitis of the cerebral sinus, directly produce the complex of symptoms of pyæmia.

The use of peroxide of hydrogen in epistaxis entails the danger of gas embolism by the entrance of gas bubbles into the open blood spaces.

The result of these observations is the absolute necessity of asepsis in nasal operations. Antiseptic operations are useless, since the microbes cannot be reached in the nooks and corners of the nose. Bactericidal drugs are not borne in proper concentration and quantity, and are transformed by the albuminous secretions into inefficacious combinations. It is, therefore, necessary to operate with aseptic hands and instruments, in order not to transfer infective agents from without, since the microbes existing in the nose remain innocuous under normal conditions owing to its protective arrangements. Cauterization of the middle turbinals should be avoided on account of endocranial complications, which have been most frequently observed just in these cases. Plugging should be done with antiseptic gauze sterilized by steam, which ought not to be left longer in the nose than twenty-four hours. In all cases, the direct treatment of the bleeding spot should be attempted, although plugging cannot be spared during the first hours.

After the cessation of the hemorrhage, the parts should be covered by antiseptic (iodol, iodoform), or indifferent, sterilizable (dermatol) powders.

REPORT OF THE MEETING OF THE AMERICAN
OTOLOGICAL SOCIETY AT NEW LONDON, CONN.,
JULY 18, 1899.

BY DR. H. O. REIK, BALTIMORE.

The meeting was called to order by the Secretary, Dr. F. L. Jack, who announced the inability of the President Dr. Arthur Mathewson, to attend, and the Society elected Dr. J. Orne Green to serve as temporary Chairman.

I.—DR. CLARENCE J. BLAKE, Boston. **Further observations on blood clot in mastoid operations.**

Dr. Blake reported the histories of 33 cases of mastoid disease, taking them consecutively as they entered the hospital, operated upon by the blood-clot method. These included both acute and chronic cases; and in every case after thoroughly cleaning out the diseased tissues the mastoid wound was stitched tightly in hope of securing union by first intention. The results were very satisfactory. Eight cases healed by primary union, in twelve the blood clot partially broke down, and in seven it was wholly broken down. In the cases of partial success the period of healing was very much shortened, however, because the clot breaking at the bottom secured good drainage, followed by granulation, while the upper and larger portion of the clot remained intact. Experimentation has shown the presence of osteoblasts within 48 hours, and in no instance did the clot show evidence of giving away in less than that time.

Discussion.—Dr. BACON said that he had seen Dr. Blake's cases and considered them most satisfactory. He had tried the method with success in acute cases and in view of Dr. Blake's experience would now attempt it in the chronic cases.

Dr. J. ORNE GREEN asked what had been the average time of healing in the acute cases. He thought Dr. Blake's results most

favorable but had been somewhat afraid of the method lest in some rare case some diseased tissue should be fastened up in the wound to give rise to more trouble. Dr. Blake replied that he knew this seemed somewhat against general surgical principles but it did not increase the danger, because the wound was one that could be readily opened, cleaned out and allowed to granulate, if the clot were not a success. The advantages of the method were the comfort of the patient, in avoiding dressings, and a great shortening of time required to secure healing. The average period in acute cases was nine days, but during the last two years eight or ten cases have been seen in which complete union took place within five days.

II.—Dr. B. A. RANDALL, Philadelphia. **The Stacke operation ; simple exenteration of the tympanic cavities.**

Dr. Randall reiterated his dissatisfaction with mere excision of the ossicles, as rarely succeeding in curing tympanic suppurations which could not have been cured without it. Even the 50% claimed as cured by its advocates is considered a huge over-statement of its value, while personally he had never secured a single success. Tympanic exenteration must be thorough, with removal of the scutum, so as to throw into one the attic, atrium, and antrum, with the deeper part of the external canal, and this is generally best done after Stacke's original method without opening the mastoid cortex. Laying the soft parts forward and chiselling into the back wall of the canal, he enters the aditus and enlarges the opening with safety by keeping a bridge of the bony annulus intact over the facial canal and stapes, then breaks away this thin bridge by an outward sweep of the spoon, and is able to freely remove all pathological tissues in every direction. Only when diseased is the outer mastoid table touched.

In replacing the soft parts, the back wall of the canal is split into a cutaneous and a periosteal layer, with excision of all cartilaginous tissue, giving better flaps of double extent for covering the bone surfaces. Gauze drainage strips through the canal hold these flaps in place, and the mastoid wound is sutured for primary union. Healing in four to eight weeks is secured in eight out of ten cases—the failures being generally due to dyscrasia.

Discussion.—Dr. GREEN said that Dr. Randall's idea of securing the two flaps in that way was very ingenious and asked if he had had any trouble in applying them because of their delicacy.

Dr. RANDALL said he had not.

Dr. SPRAGUE said that the method of operating in Schwartz's clinic was very similar to that described by Dr. Randall, though the flap suggested was entirely new to him.

Dr. BACON asked if Dr. Randall closed the posterior wound, and Dr. Randall replied that he closed it tightly, using the Halsted subcutaneous silver stitch.

III.—Dr. E. B. DENCH, New York. (Read by Title.) **The Stacke operation in chronic otorrhœa.**

The method of operation advocated by Dr. Dench is that known as the Schwartz-Stacke: first entering the antrum in the usual way, then deflecting the cartilaginous lining of the external auditory canal, and cleaning out the middle ear, he removes the wall of bone separating the antrum from the canal. Quadri-lateral flaps are then made by crossed incisions of the posterior cartilaginous canal wall, and these are held in place by gauze dressings. The mastoid wound is closed tightly. Of 17 cases operated upon by this method, 13 were entirely cured and 4 improved.

IV.—Dr. J. F. MCKERNON, New York. **Sigmoid sinus thrombosis. Seven cases. The first non-infective: recovery. Six infective: five recoveries; one fatal. With remarks upon symptomatology and treatment.**

Dr. McKernon reports in detail the histories of these cases with the results as stated above. Concerning symptomatology he says we should consider:

Otorrhœa.—The presence or history of a discharge from the auditory canal of the affected side.

Chills.—They are present in a large proportion of cases, and of the symptoms to be depended upon in aiding us to make a positive diagnosis of sinus thrombosis, the presence or history of a chill, followed by a sudden rise in the temperature, with a remission and profuse sweating, is, if present, one of our most positive signs. Even chilly sensations should put us on guard.

Temperature.—This depends on the amount of septic material entering the general circulation, which, if it be large, is immediately followed by a rise from normal to a high point, and is followed by remission. If the amount be small, the rise in temperature will be gradual, and not necessarily high.

Pulse.—When there is a sudden and high elevation of temperature there is corresponding rapidity of the pulse-rate, and it will usually be rapid even though the temperature is low.

Pain.—In most cases of thrombosis the degree of pain is greater than that present when only an ordinary mastoiditis exists.

Nausea and Vomiting.—These symptoms are nearly always present in some degree.

Consciousness.—There was a lack of normal cerebration in all cases.

Constipation.—This usually coexists with the early stages of the disease.

Concerning treatment, Dr. McKernon advocates a thorough exposure of the sinus, thoroughly cleansing the field, tapping with the hypodermic needle, and, if still in doubt, opening the sinus. Should a clot be found it is of course to be removed.

V.—Dr. CHAS. W. RICHARDSON, Washington. **Septic thrombosis of the sigmoid sinus.**

Dr. Richardson reports a case occurring in a man sixty years of age who had been sick for several weeks with "chills and fever." The right ear had been the seat of suppuration for many years. There was almost constant headache localized over the parietal region, tenderness over the mastoid, vertigo, constipation, dry foul tongue, sallow skin, and intermittent pulse. The temperature was rarely above 101° .

At the operation the sinus was exposed throughout its whole length, and the walls were found to be gangrenous. The vessel was filled with a nasty broken-down clot. The patient died twenty-six hours after the operation from the intense sepsis.

Discussion.—Dr. RANDALL advocated the reporting of such cases in the general medical journals and not solely in the otological journals. By this means physicians may become more familiar with the early symptoms of such cases and thus improve the patient's chances by operation.

Dr. BACON suggested caution in the use of the hypodermic syringe, as he had seen several cases where one could withdraw fluid blood and yet there was a soft thrombus present.

Dr. RANDALL spoke of the method recommended strongly by Dr. Whiting, of stroking the sinus and jugular vein to determine the presence of blood clot.

Dr. MCKERNON said that he had felt afraid to do this lest he should disseminate some portion of a septic clot.

Dr. RICHARDSON and Dr. MCKERNON both laid stress upon the necessity for opening the sinus with the knife, in spite of negative evidence by the needle, in cases of doubt as to the presence of a thrombus.

VI.—Dr. C. H. BURNETT, Philadelphia. **Pneumo-massage of the external auditory canal compared with inflation of the tympanum.** (Read by title.)

Dr. Burnett's conclusions are as follows: Pneumo-massage applied to the external auditory canal and membrana tympani, in both acute and chronic catarrhal processes in the middle ear, is more efficient, less of a shock to the auditory nerve, more agreeable to the patient, than inflation, and entirely free from sepsis, whereas inflation is not. Inflation of the tympana being very rarely necessary as a means of forcing air into the middle ears, the latter being very seldom in need of it, it is fair to conclude that inflation, as it must be applied to both ears whether desired or not, is usually *contra-indicated* in aural diseases. On the other hand, as drawing the membrana tympani and malleus outward and traction on the tensor tympani and restoration of the normal isolation of the auditory ossicles are desired, without any shock to the structures upon the inner wall of the drum cavity, and as this can be so safely effected by pneumatic rarefaction of the air in the auditory canal, pneumo-massage is indicated for this purpose. In fact, some form of pneumo-massage of the external ear has almost entirely superseded the use of all forms of inflation of the tympanum in my hands during the past ten years.

VII.—Dr. W. B. JOHNSON, Paterson. **Report of a case of otitic neuritis.**

Dr. Johnson points out that if optic neuritis can occur as a sequela of la grippe, otitic neuritis may occur as the result of the same conditions, whether the disease be the result of toxic poisoning, inflammation, hemorrhage, or some organic change caused by the presence of micro-organisms, or from some disturbance of the vaso-motor centres affecting the circulation. A case of otitic neuritis is reported in detail, in which during an attack of la grippe the patient became intensely deaf in both ears, was dizzy, troubled by noises in the ears, and in the early stages nausea and vomiting. The symptoms improved rapidly under the administration of supra-renal capsule, but after a lapse of three months the patient still remains absolutely deaf.

Adjournment.

AFTERNOON SESSION.

The officers elected for next year were as follows: President, Dr. H. G. Miller; Vice-President, Dr. B. A. Randall; Secretary and Treasurer, Dr. F. L. Jack.

VIII.—Dr. F. B. SPRAGUE, Providence. **A case of adenocarcinoma involving the cartilaginous meatus and the squamous and mastoid portions of the temporal bone.**

The patient, a female, age sixty-two, in good health up to four years ago, when she had a non-malignant tumor removed from the breast. The ear trouble began with a feeling of fullness, attended by periodical attacks of severe headache starting from the ear and spreading over the head and right side of the face. Examination of the ear showed a smooth, hard mass projecting downwards from the superior wall of the meatus and a second smaller one projecting upwards from the floor. Both were hard and unyielding. No tenderness about the ear, except at long intervals, when the whole condition seemed aggravated. Operation was refused for more than a year, the patient suffering a great deal, and the disease extending until, when operated upon, it was found to involve the temporal bone and the parotid gland. One year has elapsed since the operation, and the patient's condition is again becoming bad. There is facial paralysis, ptosis, diplopia, and mental failure.

Discussion.—Dr. GREEN asked if there was any reason to suppose that this tumor originated in the parotid gland.

Dr. SPRAGUE replied that there was not, and that in the early stage it seemed to be localized in the meatus.

IX.—Dr. J. ORNE GREEN, Boston. **Personal experience in tympano-mastoid exenteration.**

Dr. Green said that he believed this to be a most valuable operation for the cure of chronic suppurations deeply seated in the temporal bone, but at the same time considered it one of the most complicated operations the surgeon met with, for its success depends upon attention to the most minute details, not only in operation, but in after-treatment. He had performed the operation in some twenty-five cases, with success in all but one, both in curing the otorrhœa and in securing complete epidermization of the cavity. He considered the greatest danger in the operation to be that of injury to the facial nerve, but said that, while it had occurred with five or six of his cases, it had proven to be of a temporary nature in all but one, and in that instance he had, at the operation, found a carious opening into the Fallopian canal.

The technical difficulties he had found to be, first, thorough cleansing of the cavity after exenteration; second, getting the external surface of exposed bone covered; third, keeping down

exuberant granulation tissue; fourth, producing epidermization of the cavity.

He advises all patients to have the ear inspected once in every six or eight months, in order to remove any collections of desquamated epithelium, and thus protect against further trouble.

X.—Dr. J. O. TANSLEY, New York. **Shall we use cold in acute middle-ear or mastoid affections? if so, how long?**

Dr. Tansley referred to the old practice of twenty-five years ago, of treating acute processes of the middle ear with dry or moist heat, according as there was not or was a secretion present, and all mastoid inflammations by hot poultices. He referred to the fact that in acute inflammations of the eye, very few considered the use of cold as of any benefit in diseases more deeply seated than those of the iris or ciliary body. He believed that cold would restrain microbes if used beyond a certain degree, but thought the question was, whether we were able to obtain such a degree of cold in the ear or mastoid as could produce such a restraining influence. He thought not. He had used it a number of times in the past twenty-five years, but had concluded that in those cases which got well with it, they would have done the same without it, and in those cases which subsequently required operation it had failed to exert any curative effect whatever. He reported the history of a case to show that it might even cause greater destruction of tissue, and as it seems to accomplish nothing more than a slight restraint upon the pain and external swelling, and as it sometimes hinders in determining when to operate, he desired to go on record as being opposed to the use of cold in these cases, in any manner and for any length of time.

Discussion.—Dr. JOHNSON said that he was an advocate of hot applications, either dry or moist, in mastoid disease, and thought they were more beneficial than cold ones. He believes that if infection was present and had extended to the cells, it was very probable that neither hot nor cold would do much to check the process.

Dr. RANDALL also advocated the use of heat as being safer, more comfortable to the patient, and a more rational treatment than is afforded by cold.

Dr. BLAKE presented a resolution asking for the co-operation of the American Otological Society with a committee of the National Association of Teachers of the Deaf and Dumb, to secure systematic examination of the pupils in deaf-mute schools.

He explained the necessity of thorough examinations, in order to select those pupils who could be most benefited by special teaching, and who, perhaps, by some treatment, could be made better able to accept teaching.

The resolution was adopted, and Dr. BLAKE was appointed chairman of the committee with power to choose his colleagues.

Adjournment.

REPORT OF THE MEETING OF THE NEW YORK OTOLOGICAL SOCIETY OF MAY 23, 1899.

BY DR. H. A. ALDERTON, SECRETARY.

President, Dr. C. J. KIPP, in the chair.

Dr. MCKERNON presented a case of **scarlatinous otitis, with streptococci, mastoiditis, and facial paralysis**. Operation. The pus in the mastoid process contained streptococci. Epidural abscess. The sinus was opened and found to contain a clot surrounded by muco-pus with streptococci. Hemorrhage was induced from above ; from below pus was evacuated. The internal jugular was exposed, tied, and resected, together with a portion of the facial. Aspirated the cerebellum negatively. Uninterrupted recovery. Metastatic abscess three weeks after the operation. The patient has been rather blue since the operation and the pulse-rate rather high. There is still some slight facial disturbance.

Discussion.—Dr. EMERSON: The discharge has been spoken of as being very black at first ; might this not have been due to the blood from the polyp ?

Dr. MCKERNON thought not ; it seemed to come black directly from the mastoid.

Dr. EMERSON thought he had seen such cases in which removal of granulation tissue caused the disappearance of the black color.

Dr. MCKERNON asked advice as to a case of a **gouty or rheumatic woman**, fifty-three years old, who a number of months previously awoke with a **blowing noise in the ear**. *Mt* retracted and pale ; tube somewhat stenosed. Inflation gave only temporary relief for about half an hour ; the bougie did not do any better. He would like to know the nature of the trouble and what would benefit it.

Dr. BUCK thought that there was probably something at fault either in the naso-pharynx or in the inferior turbinates.

Dr. MCKERNON : Simply slightly atrophic.

Dr. SHEPPARD asked as to whether the patient was not anæmic.

Dr. MCKERNON : Somewhat at first, but now better ; also some digestive trouble.

Dr. BERENS : Was the circulation examined ?

Dr. MCKERNON : No.

Dr. WILSON reported a case which he had first seen in 1897, a young man, twenty years old, in whose right ear, **at the junction of the *Mt* with the upper wall of the canal, existed an oval projection**, seemingly a morbid growth. The patient was seen again two months ago ; the growth had extended along the upper wall of the canal about three-fourths of an inch and a sac, projected down from it into the canal. This sac was opened by cautery, evacuating a molasses-like fluid. The whole of the growth was burnt off. A few days ago it had healed over and was emptied of a similar material in the same way. This material was very stringy and thready, in color like the fluid obtained from a hematoma. He would like to know whether this was a malignant growth. The hearing was affected and there was some discomfort at the time ; he ventured a good prognosis.

Dr. BUCK : Did you strike exposed bone ?

Dr. WILSON : No ; no fistula or sinus ; the quantity of fluid was limited.

Dr. QUINLAN reported **a case with a continuously high temperature** of $104\frac{1}{2}^{\circ}$ – 106° F. for ten days. The patient was semi-delirious ; put the hand to the ear ; had a superficial abscess of the breast ; had a bulging *Mt* and canal wall. The *Mt* was incised. The temperature fell after this procedure and the general condition was excellent. Very little pus followed and a moderate quantity of blood. For ten days the patient had had ice-baths to lower the temperature. There was very little tenderness over the mastoid.

Dr. GRUENING thought that such a high temperature in adults was very rare as a result of otitis media. Was not surprised that there was not pus, as we all know that the streptococcus is found in the blood or serum. It may be the cause of high temperature even though there may not be pus.

Dr. KIPP remarked that Dr. Orne Green recently discovered that in the severest cases often only the staphylococcus was present and not the streptococcus.

Dr. COWEN thought that if such a temperature had lasted so

long the *Mt* would have perforated. He was inclined to believe that the temperature was due to some other condition, and the defervescence to the amelioration of this condition.

Dr. GRUENING agreed with Dr. Cowen.

Dr. TOEPLITZ reported **a similar case in a child** of twenty-one months, with a temperature varying from 101° to 104° F. There was inflammation of the throat, not diphtheritic, much swelling four weeks previously, with cervical lymphadenitis. For three weeks a temperature of 102° F., pulse 120; heavy breathing; tonsils swollen, especially below; no abscess; ears apparently normal. Incised the tonsils below; naso-pharynx still obstructed; general condition weaker and weaker. This condition kept up for three weeks, the nose then became clearer. The temperature then advanced to 105° F.; there was pain in the ear, and the left ear discharged; T. $104\frac{1}{2}^{\circ}$ F.; the right ear discharged and the temperature went down. He thought that it was due to an acute non-diphtheritic infection of Luschka's tonsil, which lasted four weeks and patient finally recovered.

Dr. QUINLAN thought that we often had an acute inflammation of the Luschka tonsil—a parenchymatous inflammation,—which originates and retains infection, especially in diphtheria. He thought that this might easily account for the temperature and the involvement of the surrounding tissues.

Dr. TOEPLITZ related the history of a case with **various auditory sensations and hallucinations**.

Dr. GRUENING reported that, three weeks before, he saw a boy, five years old, said to have **mastoiditis, with a fluctuating swelling behind the auricle**. History: Was taken sick two weeks before, complained of the ear for one day; temperature very high, at times $105-6^{\circ}$ F., at others normal. It was thought to be malaria and quinine was given in large doses. After one week the ear began to stand out. Ichthyol was used for one week. Operation: There had been no otorrhœa at any time; the *Mt* was incised, no pus; the mastoid was opened, wholly diseased to the tip, with a large quantity of pus, and was cleared out and an opening made into the antrum. The roof was carious, and on scraping away granulation tissue, brain matter oozed into the antrum. This was examined and declared to be granulation tissue. A drain was introduced into the antrum. There was no fever and the patient felt well. *5th day*: T. 105° F.; large flow of pus from the ear indicated an evacuation of a brain

abscess through the ear. Further operation denied. One week later, five days ago, the patient became drowsy. 2d operation : Exposed squama and removed the granulation tissue on the dura ; introduced forceps and pus escaped ; split the dura and opened a large cavity in the brain. The boy is doing well.

Thought we recognized our cases too late, in children, after swelling had occurred over the mastoid. In the above case the streptococcus existed both in the mastoid and in the brain abscess.

Dr. TOEPLITZ said that he had seen the patient two weeks before Dr. Gruening. At that time there was no bulging of the *Mt*, nor of the mastoid ; no evidence at that time of mastoiditis.

Dr. J. L. ADAMS asked as to whether the brain or the mastoid abscess was considered as primary.

Dr. GRUENING : The mastoid.

Dr. KIPP reported a case in which **mastoiditis and brain abscess resulted from a furuncle.**

Dr. GRUENING reported **the case of a man too dizzy to walk**, who gave the history that, six weeks before, he had suffered from otalgia followed by discharge, with headaches at times. Examination showed no fever, no headaches, good appetite, no tenderness, profuse discharge, bulging upper-posterior wall of canal, no *Mt*, granulations everywhere. He said he had had no ear disease before. Irrigations every two hours were ordered. There was optic neuritis in the eye on the same side, and the patient could not micturate. Operation : Very large abscess of the mastoid ; sigmoid groove carious and destroyed in spots ; sinus bare ; caries of the floor of the antrum ; semicircular canal open ; ossicles carious (hammer and anvil). Thought that the dizziness might either be due to disease of the semicircular canal or to a cerebellar abscess.

Dr. FRIDENBERG thought that these cases demonstrated the frequent latency of mastoid affections. Thought that a profuse discharge, too profuse to come from the middle ear, indicates mastoid invasion and should call for operation.

Dr. GRUENING agreed.

Dr. DUANE thought that, in Dr. McKernon's case of blowing noise in the ear, the case was, very possibly, due to vascular disturbance in the tympanum and might be remedied by the use of a vaso-motor stimulant like nitroglycerine.

Dr. WHITING asked Dr. Gruening as to whether, when the semi-

circular canals were carious, there was not an absence of vertigo. There must be destruction of the vestibular branch, and the seat of the dizziness must be farther in.

Dr. GRUENING said that he did not mean to say that the nerve was destroyed. There was considerable vertigo in this case.

Dr. KIPP had a case in which **accidental opening of the semicircular canal** was followed by profuse and prolonged discharge of lymph.

Dr. KNAPP spoke as to the **advisability of paracentesis**. He had done a paracentesis and internal Wilde's up into the attic in a cases of acute otitis involving Schrapnell's membrane; followed by primary union with relief of all the symptoms. This procedure often prevents mastoid complications or ameliorates them when present. It should be done thoroughly so as to go through the periosteum.

Dr. GRUENING thought that the Society would agree with Dr. Knapp. The statement had been made in the Society that when the paracentesis was thoroughly done it was never necessary to repeat. Recently he had a case in which he had to repeat the operation on four successive days; bringing down the temperature each time and probably averting mastoiditis.

Dr. MCKERNON had similar cases.

Dr. KIPP reported a case of **sinus phlebitis**.

Dr. GRUENING questioned whether it was advisable to close the wound in the neck in every case.

Dr. KIPP stated that he had closed the wound in this case because there was no pus; the wound was perfectly pure.

Dr. GRUENING had congratulated himself at times on having kept the wound open, as the vein afterwards infected the wound.

Dr. KIPP would certainly have quickly opened the wound under those conditions.

Dr. GRUENING: The point was as to the closure.

Dr. WHITING had had to rip the wound open even in resection of the vein.

Dr. MCKERNON did not see why, in cases of resection of the vein, the wound should not be closed.

Dr. WHITING reported the **finding of a double internal jugular** of the left side, both very large, in a case in the dissecting room.

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1899.

BY DR. A. HARTMANN, BERLIN.

Translated by Dr. ARNOLD H. KNAPP.

ANATOMY OF THE EAR.

1. CANNIEU, A. Researches on the terminal apparatus of the auditory nerve. *Journ. de l'anatomie*, etc., vol. xxx., No. 1.
2. TRIFILETTI, A. Experiments on the semicircular canals of doves. *Gazzetta degli ospedali*, No. 19.
3. ESCHWEILER, R. Comparative anatomy of the muscles and of the topography of the middle ear of different mammals. *Arch. f. mikrosk. Anatomie und Entwicklungsgeschichte*, vol. liii., 1898.
4. BONOME, L. The anatomical peculiarities of the mastoid process and its topography relative to aural surgery. *Arch. ital. di Otologia*, etc., vol. xiii., p. 233.

1. CANNIEU examined the epithelium of the maculæ and cristæ acusticæ in numerous animals and in man, and could distinguish two types: The one in the rodents, where three rows of cells were superimposed, one being composed of hair cells, and the other two of supporting cells. The second type, found in beasts of prey and in man, contains four rows of cells, of which the hair cells occupy two rows. The cells are similar in their build, the cell-body tapers towards its free end while at its base it divides into several long fibres. The hair cells are characterized only by their hairs. The nerves terminate in a sort of ramification; the separate branches had small heads and are in contact with the body of the hair cell. Some nerves terminate free between the hair cells.

KRAUSE.

3. ESCHWEILER contributes an interesting and creditable communication on the comparative anatomy of the middle ear. The duck-bill has no stapedius muscle; the tensor tympani is composed of two parts, one of which is connected with the pharyngeal muscles, the other arises independently from the labyrinthine wall. A true Eustachian canal is absent and the pharyngeal glands protrude into the middle ear. In the echidna the membrana flaccida contains radially arranged muscular fibres. The tensor tympani in this group is independent of the Eustachian canal and the pharyngeal muscles, and arises from the floor of the tympanum. There is no stapedius. In the *manis javanica* the stapedius is present but the tensor tympani is wanting. The drum is surrounded by a peculiar erectile body which influences tension according to the state of congestion. In the mouse, the tensor tympani also has a double origin, though the two muscular bellies very soon unite. This muscle in the cat arises from the petrous portion of the temporal bone. KRAUSE.

4. A topographical study with illustrations of the various anatomical varieties of the mastoid process with reference to retro-tympanic field of operation and the relations of the brain to the middle and internal ear. The author values percussion of the mastoid process after retraction of the soft parts. GRADENIGO.

PHYSIOLOGY OF THE EAR.

5. HAMMERSCHLAG. On the tensor reflex. *Arch. f. Ohrenhkl.*, vol. xlv., p. 1, and OSTMANN. Remarks on preceding paper. *Ibid.*

6. EGGER. On the physiology and pathological physiology of the labyrinth in man. *Centralbl. f. Nervenheilk. u. Psychiatrie*, vol. x.

7. URBANTSCHITSCH. The influence of auditory sensation on handwriting. *Arch. f. die gesammte Physiologie*, vol. lxxiv., 1899.

5. HAMMERSCHLAG reports several experiments, which he had tried in the course of an extensive investigation to determine the course of the tensor reflex, which coincide with the results obtained by other investigators and especially Pollak. The tensor tympani reacts reflexly to acoustic stimulation, especially to high tones. If the drum is destroyed on one side and the hammer freed from its articulations so that it remains hanging to the tensor tendon, it will be noticed to move distinctly if a sound is produced in front of the other and intact ear. If the drum of the second ear is also

destroyed and the sound conduction hindered, the reflex quivering of the tensor became weaker or invisible. The experiments were carried on on young cats and dogs. They are more difficult on older animals. Hammerschlag finally criticises OSTMANN'S results, to which Ostmann replies though without adding to the knowledge of the subject. BLOCH.

6. EGGER in two clinical observations finds a confirmation of the Mach-Breuer hypothesis, that the semicircular canals serve for the perception of angular acceleration, and the utriculus for the perception of the position of the body from the vertical.

CASE 1.—Man, aged forty-three, recently totally deaf after syphilitic caries of the internal ear. Reflexes and sensation normal. Marked static and taxic disturbances. Examination with the centrifuge shows presence of sensations of passive total movements and accompanying rotatory nystagmus. Cerebellar lesion excluded. *Diagnosis*: Lesion of the static organ (utriculus), with preserved organ of the circular canals, which perceives passive total movements and compensatory ocular movements.

CASE 2. Bulbar tabes; total deafness. No disturbance of static and locomotor movements; with the centrifuge shows complete want of the perception of passive total movements and of rotatory nystagmus. *Diagnosis*: Destruction of circular canals with preservation of the utriculus. BRÜHL.

7. Auditory sensations may produce marked changes in handwriting, which differ according to whether high or low tones react upon the ear. Harmonica tones were employed. Deep tones cause in many people a marked lessening of the tone of the muscles employed in writing; the writing becomes unsteady. High tones produce an opposite effect. The tone of the muscles of the arm is increased, sometimes to such an extent as to produce a cramp. The letters of the writing appear stiff, smaller, and close together. HARTMANN.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

8. GERONZI. Clinical report of the scholastic year 1896-97 of the otological clinic of the University, Rome. *Arch. ital. di Otol.*, etc., vol. viii., pp. 65, 138.

9. ARSLAN. Report for 1897 of the ear, nose, and throat clinic in Padua. *Ibid.*, pp. 75, 113.

10. GAVILLO. Report, from June 30, 1896, to June 30, 1897,

of the ear, nose, and throat clinic of the University in Turin. *Ibid.*, vol. vii., p. 377, and vol. viii., p. 83.

11. LIEBMAN. Lectures on disturbances of speech. 3d number: *Deaf-mutism*, Berlin, 1898. O. Coblentz.

12. POLLNOW. The requirements of hearing of railway employés and the examination for the same. Lecture given to the Society of Railway Surgeons in Cologne, Sept. 13, 1898. F. Weigel, Nürnberg.

13. HAUG. Remarks on the treatment of the most frequent aural affections. *Deutsche Praxis*, Nos. 3, 4, and 5.

14. ALDERTON, H. A. Some unusual aural cases. *Annals of Otol., Rhinol., and Laryng.*, Feb., 1899.

15. MANHATTAN EYE AND EAR HOSPITAL. 29th Annual Report, for the year ending Sept. 30, 1898.

16. BROOKLYN EYE AND EAR HOSPITAL. 30th Annual Report, for the year 1898.

8-10. The ear clinic in Rome treated 897 patients, in Padua 1224, and in Turin 1169. The reports give statistical tables and descriptions of the more important cases. GRADENIGO.

11. This is a complete description of deaf-mutism and of the results obtainable by treatment. Insufficient attention and unreliable memory are important factors in the etiology. LIEBMAN distinguishes four forms of deaf-mutism: 1. Motor variety (the children comprehend what is spoken, but do not speak). 2. Sensory variety (the children do not understand what is spoken). 3. Motor and sensory varieties. 4. Transitional cases, between deaf-mutism and stuttering. The first group is the most frequent. Four histories are fully described. The treatment is very tedious and painstaking, though generally thankful, and requires, on an average, three to four months. HARTMANN.

14. The first case was that of a young man, twenty-seven years of age, who complained of deafness and tinnitus in the left ear. The watch was heard at twelve inches. With the c^3 fork by B. C., when placed on the mastoid process of the left ear, two notes were heard (with the finger in the right ear to shut out A. C.), one a little later than the other; at the end of thirteen seconds the note heard by the left ear ceased, while that heard by the right ear continued to be heard for seventeen seconds more. The c^3 fork was the only one that gave such reaction. He reports also two cases of peculiarly shaped (conical) exostosis of the ex-

ternal auditory canal. In each case the exostosis was very sharp-pointed, like a cone.

A fourth case was one of marked vertigo, following stimulation of the nerve endings of the middle ear, without change in labyrinth tension. In this case the carious ossicles had been removed, but the stapes was left in situ. Syringing or pressure on the stapes caused severe vertigo, dilatation of the pupils, a feeling of oppression in the breathing, and a decided weak action of the heart.

GORHAM BACON.

15. Surgeons, Aural Department: Drs. Roosa, Pomeroy, Webster, Emerson, Lewis, and Hepburn. Number of new patients in Ear Department, 3366; number of ear operations, 241; incision for furuncles, 50; paracentesis of mem. tympani, 20; removal of polypi, 40; excision of ossicles, 4; mastoid operation, 36; opening of lateral sinus, 5; opening of brain abscess, 2.

GORHAM BACON.

16. Surgeons, Aural Department: Drs. Mathewson, Prout, Rushmore, Sheppard, and Alderton. Diseases of the ear: New patients, 3396; operations, 372; incision of furuncle, 107; paracentesis of mem. tympani, 74; removal of polypi, 75; removal of carious ossicles, 6; mastoid operation, 25; removal of adenoids, 12.

GORHAM BACON.

b.—GENERAL SYMPTOMATOLOGY AND PATHOLOGY.

17. ROSENBACH. Involvement of the ear and nose in general arterio-sclerosis. *Deutsche med. Wochenschr.*, No. 4, 1899.

18. OUSPENSKI. A case of reciprocal influence of a diseased ear on a sound one.

17. Referring to a paper with this title by Heermann, ROSENBACH cites from his book on the diseases of the heart and their treatment, published in 1897, showing that the involvement of the ear and nose in general arteriosclerosis had been noted and thoroughly discussed by him.

NOLTENIUS.

18. After removal of a cotton plug from one ear, the hearing in that ear and also in the other was raised to the normal. The hearing for the watch was formerly 2.5 cm; it is not stated what it later was.

ZIMMERMAN.

c.—METHODS OF EXAMINATION AND TREATMENT.

19. LUXENBURGER. The new local anaesthetic, nirvanin. *Münch. med. Wochenschr.*, No. 1, 1899.

20. VILLA. Anæsthesia with holocain in the nose, ear, and throat. *Arch. ital. di Otol.*, etc., vol. viii., p. 9.

21. URBANTSCHITSCH. Methodical hearing exercises and their value for the deaf. *Wien. klin. Wochenschr.*, No. 8, 1899.

22. BRUNNER. Contribution to the discussion of the methodical hearing exercises in the school for deaf-mutes. *Wiener klinisch Wochenschr.*, No. 12, 1899.

19. Nirvanin is superior to cocaine and the cocaine combinations to produce regionary and infiltration anæsthesia. For the ear and nose $\frac{1}{4}$ per cent. solution is employed, but in inflamed tissues $\frac{1}{2}$ per cent. solution is better. This agent may be of benefit in the opening of the mastoid process. SCHEIBE.

20. VILLA has employed holocain in 66 operations. The solution does not change on boiling and so can be sterilized; the cost is moderate, the taste not disagreeable, and it does not cause unpleasant symptoms. The 10 per cent. solution has a greater and quicker anæsthetic action than cocaine, and on long application produces ischemia. GRADENIGO.

21. In a rather extensive paper URBANTSCHITSCH describes the method of hearing exercises. These employ partly various sources of sound and partly a methodical instruction with speaking sounds. A healthier hearing function is stimulated, and on the other hand an improvement in distinguishing sounds. The author recommends an extended use of methodical hearing exercises in chronic deafness, as they can be only of advantage to the deaf without interfering with the rest of the treatment. In the cases where every treatment for the condition causing the deafness has been without avail the hearing exercises prove of great value, as it is possible to obtain through them an improvement in differential hearing with, perhaps, no true increase in hearing, but a better use of the hearing which remains. POLLAK.

22. BRUNNER is in favor of the methodical hearing exercises for deaf-mutes. POLLAK.

EXTERNAL EAR.

23. MARTIN, W. A. Scalding oil in the ear and the result. *Laryngoscope*, March, 1899.

24. HENKE. Supernumerary polyotia. *Monatschr. f. Ohrenhkl.*, No. 2, 1899.

25. LAMANN. The tamponade treatment of otitis externa furunculosa. *Monatschr. f. Ohrenhkl.*, No. 12, 1899.

26. STETTER. Myringitis chronica sicca and its treatment. *Monatschr. f. Ohrenhkl.*, No. 3, 1899.

27. COZZOLINO. A case of pseudo-actinomycosis of the external ear produced by a new thread bacterium. 1st part. *Arch. f. Ohrenheilk.*, vol. xlv., p. 37.

28. COMPAIRED. Curious clinical cases. *Ann. des mal. de l'or., au lar.*, xxv., 3.

23. The case was that of a young woman who had an earache and who poured hot olive oil into the canal for the relief of pain, with the result that the external ear and drumhead were severely burned. When the more acute symptoms had subsided it was found that there was a large kidney-shaped perforation in the drumhead. The perforation finally closed.

GORHAM BACON.

24. The auricle of a child showed in addition to the enlargement of the lobule a marked broadening of the scaphoid fossa, which was divided by a ridge into two grooves. Each of these presented a Darwinian tubercle at the helix. Developmental retardation was also seen in the corresponding hand.

KILLIAN.

25. A cotton plug wound on a probe and impregnated with the following ointment: zinc oxide 4.0, carbolic ac. 0.6, white vaselin 30.0, is introduced into the inflamed ear-canal to the drum, producing considerable pressure. This procedure, quite painful at the beginning, must be repeated daily.

KILLIAN.

26. The verbose and inexact description gives a very uncertain and vague picture of the disease reported.

KILLIAN.

27. COZZOLINO found in an acute suppuration from the left ear of a woman eight months pregnant, an excoriated place in the mastoid region which resembled clinically, actinomycosis. The pus contains instead of greenish granules, small white, and a few blackish red seeds. These were composed principally of a particular kind of thread bacterium. The specimens showed a ray fungus. The woman subsequently died of a recurrence in the lungs and of a basilar meningitis, which will be described in the 2d part.

BLOCH.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

29. GREEN, J. ORNE. The primary infection in acute sup-

purations of the tympanum. *The Journal of the Boston Society of Med. Sciences*, Jan., 1899.

30. SHEPPARD, J. E. The manner in which the mastoid becomes involved in the middle-ear affections. *Brooklyn Med. Journal*, March, 1899.

31. BURNETT, CHAS. H. A case of acute mastoiditis; perforation of the medial plate of the process and consecutive abscess in the neck. *University Medical Magazine*, Feb., 1899.

32. MORTON, H. M. A case of bilateral mastoiditis. *Laryngoscope*, Feb., 1899.

33. LUC. Two cases of Bezold's mastoiditis. *Arch. intern. de lar., d'ot.*, xii., 1.

34. ONSPENSKI. A case of otitis due to grippe, with cholesteatoma and mastoiditis, cured without operation. *Ann. des mal. de l'or. du lar.*, xxv., 1.

29. GREEN gives the results of bacteriological examination in 101 cultures made from the first drop of pus evacuated after paracentesis of the drum-membrane in acute suppuration of the tympanum. The cases selected were all acute suppurations requiring paracentesis for evacuation of secretion and relief of pain. The meatus was thoroughly cleansed and all aseptic precautions taken in regard to the instruments.

In 73 out of the 101 cases pure cultures were reported, viz. :
 Staphylococcus, (albus 8, aureus 9, variety not stated 19) . . . 36
 Streptococcus 19
 Pneumococcus 10
 Bacillus diphtheriæ 2
 Bacillus pyocyaneus 3
 A capsule bacillus 3

There were 28 cases of mixed infections. Some of Green's first cultures proved the presence of pyogenic organisms in the very earliest stages of the disease. GORHAM BACON.

30. In this paper, SHEPPARD calls attention to the anatomy of the mastoid cells, the antrum, aditus, and attic, and explains how the mastoid cells are liable to be affected. He says that "there is no special reason why, if left alone, the pus will perforate the outer rather than the inner cortex, hence it becomes plain why the external symptoms of mastoiditis should never be waited for, and why conservatism compels an early operation." The germs most frequently present in acute middle-ear inflammations are the

streptococcus and the pneumo-diplococcus. One is more apt to find the staphylococcus in chronic suppurations.

As a rule, the most virulent infections are due to the streptococcus.

GORHAM BACON.

31. The case reported by BURNETT was that of a man, thirty-two years old, who had had an acute otitis media of three weeks' duration, with mastoid symptoms—chiefly pain. When first seen by the writer, there was a copious discharge from the right ear, an infiltrated and narrowed canal, and a perforation in the membrana tympani. The mastoid region appeared to be normal except that behind and in front of the insertion of the sterno-mastoid muscle there was a swelling, extending downward for about three inches. Pressure on this swelling forced pus through the perforation in the drumhead.

A diagnosis of Bezold's mastoiditis was made. A free incision was made in the swelling and a grooved director was passed into the mastoid cavity. Solutions were syringed into the incision and escaped through the external meatus. A drainage-tube was inserted into the neck wound, the treatment consisting in the irrigation of the wound and the ear, without further operation. The patient made a good recovery and the hearing became normal.

GORHAM BACON.

32. The case was that of a woman, aged forty-four, who was a sufferer from naso-pharyngeal catarrh. As a result of using a nasal douche, she suddenly had pain in both ears, followed by discharge from the auditory canals and swelling and redness of the tissues over the mastoid processes. The pain was severe and there was considerable elevation of temperature. Both mastoid processes were opened and pus and granulation tissue removed. The patient recovered with good hearing.

GORHAM BACON.

33. CASE I. Man, twenty-three years old; a slowly developing relapse of an otitis two years previous. At the first operation, the mastoid process and antrum contained granulations and there was a collection of pus to the inner side of the sterno-mastoid extending to the mastoid tip. Six weeks later, owing to profuse purulent discharge persisting from the depth, another operation had to be undertaken and the greater part of the mastoid was removed, fully exposing the abscess cavity. The antrum and middle ear were curetted. Complete facial paralysis. The suppuration ceased six months later, but the facial paralysis partly remained.

CASE 2. Was first seen after the purulent process in the neck had been incised and a fistula presented, 5 cm below mastoid and at posterior border of sterno-mastoid leading to the inner side of the mastoid process.

ZIMMERMANN.

34. After influenza a woman, thirty-two years of age, suffered with a double acute otitis, pain, and mastoid swelling. The discharge from a perforation up and back was muco-purulent in the right ear. The discharge also contained small epithelial scales which ONSPENSKI regarded as cholesteatomatous. Recovery took place after irrigations of the middle ear through the Eustachian tube and the ear-canal for a period of six weeks. This leads the author to decry against the too frequent mastoid operation.

ZIMMERMANN.

b.—CHRONIC OTITIS MEDIA.

35. ROSATI. Oxygen in chronic purulent otitis. *Arch. ital. di Otol.*, etc., vol. viii., p. 9.

36. GOTTWALD. Caries of the middle ear and its relation to cholesteatoma from a medico-legal aspect. *Vierteljahrsschrift f. gerichtliche Medicin*, vol. xvii., supp. 1, 1899.

37. GRADENIGO. Contribution to the surgery of the middle ear and the mastoid. *Arch. ital. di Otol.*, etc., vol. viii., pp. 33, 151, 265.

38. MOURE. Immediate suture of the auricle after the radical cure for otorrhœa. *Rev. hebdom. de lar. d'ot.*, 2, 1899.

39. ROBINSON, H. BETHAM. A case of squamous-celled carcinoma following a chronic suppurative otitis media. *Journ. of Laryng.*, March, 1899.

35. ROSATI used oxygen exclusively in the treatment of 15 middle-ear suppurations. The gas was introduced into the ear canal with Politzer's bag; later directly from the gas apparatus. Except in one case the results were favorable.

GRADENIGO.

37. At the Turin clinic the mastoid process was opened in 75 cases of acute inflammation, in 100 chronic cases, in 53 extradural abscesses and suppurations, in 6 sinus thromboses, in 4 cerebral and 5 cerebellar abscesses, in 7 otitic lepto-meningitis.

GRADENIGO.

38. MOURE recommends the primary closure of the retro-auricular wound in every case, and believes thus to have solved all the difficulties of after-treatment. The sutures were removed

on the eighth day, and two days later the patient returns to his occupation without bandage. Moure does not make use of any plastic procedure. ZIMMERMANN.

39. A woman, aged forty-six, had suffered for twenty years with discharge from the right ear. Four years previously the discharge had increased, with deafness, tinnitus, and shooting pains in the head. Four months previously the headache on the right side had become continuous, the discharge being thick and greenish yellow.

On examination, the meatus was blocked with soft, easily bleeding granulations. Tenderness was present over the mastoid region, and some weakness of the face muscles was evident.

The antrum was opened and cleared out. Soon after the operation, sprouting of granulations took place at the lower edges of the wound; and granulations recurred in the meatus; with fulness in front of the ear below the zygoma. Pain became severe. Sections of the growth showed it to be squamous epithelioma. Nothing further was done. ARTHUR CHEATLE.

C.—COMPLICATIONS OF CHRONIC PURULENT OTITIS.

40. BELL, JAMES. A case of abscess of the temporo-sphenoidal lobe, presenting unusual features; operations; recovery. *Annals of Otol., Rhinol., and Laryngol.*, Feb., 1899.

41. BERENS, T. P. A case of sigmoid and lateral sinus thrombosis, from acute suppuration of the middle ear; operation; relief; subsequent abscess in the temporo-sphenoidal lobe of the brain; operation; death; autopsy. *Annals of Otol., Rhinol., and Laryngol.*, Feb., 1899.

42. GREEN, J. ORNE. The bacteriology of mastoiditis. *The Jour. of the Boston Soc. of Med. Sciences*, Jan., 1899.

43. MILLIGAN, W. Some observations upon the pathology of intracranial suppuration of otitic and rhinitic origin. *The Manchester Med. Chronicle*, Jan., 1899.

44. SHENNAN, T., and MILES, A. Aphasia, following abscess of the temporo-sphenoidal lobe. *British Med. Jour.*, Jan. 28, 1899.

45. NICOLL. A case of cerebellar abscess successfully treated by operation. *The Glasgow Med. Jour.*, Jan., 1899.

46. KERR, J. Two cases of lateral sinus pyæmia. *British Med. Jour.*, Feb. 11, 1899.

47. MERKENS. A contribution to the subject of otitic brain abscess. *Deutsche Zeitschr. f. Chirurg.*, vol. li., p. 157.

48. MEYER. A case of otitic sinus thrombosis ; pyæmia ; recovery. *Deutsche Zeitschr. f. Chirurg.*, vol. li., p. 157.

49. BIEHL. Extensive retrograde transportation of thrombosed material after an otitic thrombo-phlebitis of the left sigmoid sinus. *Monatschr. f. Ohrenheilk.*, No. 1, 1899.

50. LAURENS, G. Two cases of otic pyæmia without apparent involvement of the lateral sinus. *Ann. des mal. de l'or. du lar.*, xxv., 1.

40. The patient, male, twenty-eight years of age, had a chronic otorrhœa, followed by mastoid disease. The mastoid process was opened by Dr. Buller, but no pus was found. He had intense headache, with vomiting and delirium, and a temperature of 104° F. There was retraction of the head, and the neck was quite stiff. Later there was photophobia, stupor, and subsultus tendinum. The patient would also cry out every few moments. The pulse became slow and the temperature fell to $99\frac{1}{2}^{\circ}$ F. Facial paralysis of the left side was noticed, and power of the left arm suddenly disappeared, with impairment of sensation all over the same arm. The patient at this time was transferred to Dr. BELL's care. The original mastoid incision was continued upwards. On opening the dura, a flow of pus occurred (extradural abscess). Later the temporo-sphenoidal lobe was opened, and two abscesses were found. Cultures from these abscesses showed pure growths of the streptococcus pyogenes. The patient afterwards returned, on account of having had a convulsion. There was at this time a sinus leading to carious bone.

GORHAM BACON.

41. The patient, male, aged twenty, had mastoid disease as a result of acute otitis media. His condition improved temporarily, but he soon complained of severe pain, tenderness on pressure over the mastoid process, and vertigo. Temperature 103° F. ; pulse 100. He later had retraction of the head, inactive dilatation of the left pupil, distention of the retinal vessels, and slight optic neuritis. The mastoid cells were opened and the sigmoid sinus exposed and a firm clot removed. The blood current was re-established in the sinus and the patient was apparently convalescent when, on the nineteenth day after the operation, he had a rise in temperature followed by profuse sweating and a rapid pulse.

The patient died. At the autopsy the superior petrosal sinus was found occluded in its whole length by a clot. No pus. The pia and arachnoid were œdematous and the quantity of the cerebro-spinal fluid was increased. In the left temporo-sphenoidal lobe a small abscess was discovered. Death seemed to be due to sepsis combined with œdema of the brain, and softening and abscess formation of the temporo-sphenoidal lobe.

GORHAM BACON.

42. GREEN gives a table compiled from 144 mastoid operations, in which cultures were made from the interior of the mastoid. He says in this paper that he "has considered the disease merely from the bacteriological standpoint, and these figures show that we may have in mastoiditis all of the more common varieties of microbes, that the staphylococcus is much more common than the streptococcus, and that, so far as the few fatal cases can prove anything, they show that the staphylococcus is equally fatal with the streptococcus. He does not believe that the special variety of micro-organism is of much importance in the disease.

"From a clinical point of view, vastly more depends on the histological and anatomical peculiarities of the bone than on the variety of microbe."

GORHAM BACON.

43. This paper is an admirable *résumé* of the subject and should be carefully read. MILLIGAN relates numerous cases to illustrate important points.

CHEATLE.

44. At a meeting of the Edinburgh Medico-Chirurgical Society held on January 18th, SHENNAN and MILES read a paper on a case of aphasia, following abscess in the temporo-sphenoidal lobe secondary to middle-ear suppuration, the auditory (word-hearing) centre not being involved. The day following evacuation of the pus, it was observed that the patient showed symptoms of paraphasia and word-intoxication. He was unable to name objects at sight. This amnesia verbalis continued throughout, and there was practically no word-deafness. When this was present, as occasionally happened, it was relieved at once by drainage being improved and thus relieving pressure on the auditory centre. He was able for a time to play a game of dominoes, and to read the newspaper with understanding. Later the case became worse, and he died with symptoms of general compression. At the post-mortem examination, an old abscess, with inspissated contents, was found occupying practically the whole of the temporo-sphenoidal lobe, with the exception of the posterior part of the

superior convolution. A recent abscess was found in the position of the external capsule, and from this a series of recent abscesses extended backwards as far as the level of the angular gyrus, which were accountable for the later symptoms.

The authors stated that the case supported the theory advanced by Dr. Wm. Elder, that there exists a special area in which the memory of nouns and names is stored in close proximity to the auditory centre but not identical with it. He places it below that centre in the posterior parts of the second and third temporo-sphenoidal convolution. The primary abscess in the lobe would interrupt fibres passing from such an area to Broca's convolution.

CHEATLE.

45. At a meeting of the Glasgow Medico-Chirurgical Society, held on Nov. 4, 1898, NICOLL showed a man, aged twenty-six, who having had discharge from the left ear for ten years was seized, one month before coming under observation, with pain, general headache, and facial paralysis. These symptoms were soon followed by vomiting, shivering, tenderness over the mastoid, and drowsiness. The antrum was opened by Barr and cleared of pus; for two days he was apathetic and yawned repeatedly, and nystagmus with variability of the left pupil was noticed. On the third day, the temperature was subnormal, pulse 96, and the left pupil was twice as large as the right. Nicoll then explored the lateral sinus, which was found healthy. On further operative investigation, an abscess was found at the edge of the occipital bone. As progress was slow, six weeks later the cerebellar fossa was opened and another abscess was found which communicated with the one previously opened. Recovery.

ARTHUR CHEATLE.

46. The first of KERR's two cases was fatal in spite of free operation, ligature of internal jugular, etc. Antistreptococcic serum produced no result. An interesting point in the case is that infection appeared to have reached the sinus by extension from the floor of the middle ear through the vault of the jugular dome.

The second recovered; the serum was used in this case also, but appeared to have produced no beneficial effect.

ARTHUR CHEATLE.

47. A man, thirty-two years old, was operated on by a specialist according to the radical method on account of a left chronic otorrhœa. Discharged two weeks later notwithstanding headache. These symptoms increased and patient became stuporous. When admitted to the hospital in Moabit he was in coma, 36.7°.

pulse 59, partial third-nerve paralysis on the affected side, crossed paralysis of the extremities. The diagnosis of abscess of the temporal lobe was made. Trephine opening through squama. Operation was interrupted for three-quarters of an hour on account of asphyxia. The temporal lobe was incised and fetid pus escaped. Death on the following morning. *Autopsy*: Large defect in the upper bony wall of auditory canal, the posterior wall is partly wanting, a depression in the mastoid behind canal, œdema of the brain. As the ear had not been examined before last operation, the bony defect in the canal escaped notice and the trephine opening was placed in the squama. The antrum was found unopened. Bacteriological examination showed typhoid bacilli (or very similar) in the pus. BRÜHL.

48. A laborer, twenty-four years old, was admitted to the hospital in Frankfurt with the diagnosis typhoid. Right otorrhœa since childhood. Examination of the ear revealed nothing; no otorrhœa, no tenderness or swelling over mastoid. Temp. 40.5° - 37° ; chill, vertigo, vomiting, and headache. *1st Operation*: Sinus exposed, perisinuous abscess evacuated. Fall of temperature. After four days, recurrence of symptoms. *2d Operation*: Ligation of the int. jugular vein; no thrombus present. Mastoid process opened. A sequestrum was found in the depth next to the dura and the sinus. The sinus was freely opened and contained puriform thrombus. General condition good though pyæmic symptoms continued; rigors, temp. 35.6° - 40.6° , no metastases. Normal temperature after three weeks; wound healed.

The pyæmic symptoms after clearing out the sinus were referred to persisting infectious material in the jugular foramen; the extension was prevented by the ligation of the jugular vein. An otoscopic examination before the operation would have immediately detected an otorrhœa and the necessity of opening the mastoid. BRÜHL.

49. A soldier suffering from a chronic purulent otitis with cholesteatoma, extradural abscess, extensive thrombosis of the cerebral sinuses and jugular vein, and a double pleurisy, died. At autopsy a peculiar arrangement of thrombus formation was found, which was only explicable by a carrying back of the infectious material from the right transverse and sigmoid sinuses. The right inferior petrosal, cavernous, and kidney sinuses were thrombosed, also the ophthalmic vein, the left transverse sinus, and the vein of the Sylvian fossa. The author believes that the interfer-

ence with respiration from the pleural exudate and the marked tympanites had caused the backward circulation in the venous system.

KILLIAN.

50. In the first case the sinus wall was covered with fungoid masses but of healthy color, consistence, and pulsation. Though the wound-healing progressed favorably, pyæmic symptoms continued for two months.

In the second case, after repeated paracenteses, the sinus was exposed, aspirated, and found normal, though no pus had been found in the mastoid or antrum, or near the sinus. A periarticular abscess at the wrist was later opened. The general condition improved, the otorrhœa ceased, and after one month the child was cured.

ZIMMERMANN.

NERVOUS APPARATUS.

51. ERDTMANN, P. W. Disturbance of equilibrium associated with defect of hearing—labyrinthine vertigo (Ménière's disease). *Philadelphia Med. Journal*, Jan. 28, 1899.

52. WAGENHÄUSER. Deafness in the course of an osteomyelitis, caused by anæmia. *Arch. f. Ohrenhilk.*, vol. xlv., p. 33.

51. The patient had suffered from sudden attacks of vertigo during the preceding ten months. They increased in frequency so that she had about two a day. Besides the vertigo, she had a roaring tinnitus which was constant but exaggerated during these attacks, when she was obliged to hold on to something for support. Hearing defective on the affected side. During some of the attacks the patient almost lost consciousness. Pilocarpine was given, also quinine and nitro-glycerin. In 2½ months' time the attacks had entirely ceased and the hearing became normal.

GORHAM BACON.

52. A young man, seventeen years old, was taken ill with osteomyelitis after an accident. After repeated operations, the very anæmic individual suffered from bilateral deafness, vertigo, and dizziness. The last two symptoms disappeared on the improvement in his general health, though the deafness remained. The otoscopic examination was negative. According to the author the deafness was due to the anæmia.

BLOCH.

NOSE AND NASOPHARYNX.

a.—GENERAL PATHOLOGY.

53. GROSHENTZ, A. The relation of hypsistaphylia to leptoprosopia. *Arch. f. Laryngol.*, viii.

54. HAJEK. Headache in affections of the nose and the accessory cavities. *Wien. med. Presse*, No. 11, 1899.

55. MÜLLER. The connection between the diseases of the eyes and those of the nose and accessory cavities. *Münch. medicin. Wochenschr.*, No. 3, 1899.

56. RISCHAWY. The relations of chronic affection of the lachrymal passages and nasal disease. *Wien. klin. Rundschau*, No. 8, 1899.

57. GUYE. A case of nasal aprosexia without involvement of hearing. *Ann. des mal. de l'or., du lar.*, xxv., 2.

58. BRAISLIN, W. C. Ear diseases coexistent with adenoids of the naso-pharynx. An analysis of 110 cases. *Phila. Med. Jour.*, Feb. 25, 1899.

59. THOMPSON, J. A. Headache from nasal causes. *Four. Amer. Med. Assoc.*, Jan. 14, 1899.

60. STEIN, OTTO J. Vertigo, especially as related to nasal diseases. *Phila. Med. Jour.*, Jan. 7, 1899.

53. After E. Fränkel, with Siebenmann's aid, had shown by measurements that the palate index (height of palate x 100, divided by the breadth of palate measured between the two premolars) in 59 individuals with hypertrophy of the pharyngeal tonsil was almost the same as in individuals without hypertrophy, the author believes that the former theory on the cause of the high palate (hypsistaphylia), as being the result of interfered nasal respiration, is refuted. He endeavored to find another dependent condition of the hypsistaphylia, and found it in the relation of the shape of the palate and the skeleton of the face. The upper-face index is found by multiplying the height of the upper face (distance of naso-frontal suture from the alveolas of the superior maxilla) with 100 and divide with the face breadth (distance between the two zygomatic arches). When this index is below 50, the individual belongs to the group of chamæprosops (broad face); when above, to the leptoprosops (long face). Sixteen skulls were measured and gave the following results: 1. Hypsistaphylia is usually associated with leptoprosopia. 2. Narrow nasal cavities (leptorhinia) and narrow orbits usually belong to hypsistaphylia. 3. Hypsistaphylia usually depends on a congenital racial condition of the skull and not an extra-uterine, later influence from nasal stenosis.

ZARNIKO.

54. The causes of headache are usually: 1, acute or chronic

affections of the accessory cavities ; and 2, certain hypertrophies of the nasal mucous membrane. In acute empyema the headache is usually neuralgic in character, while in the chronic empyemata more diffuse headaches of a less definite character are present. In acute empyema of the maxillary antrum, neuralgic pains occur in the area of the infra-orbital and supra-dental nerves ; in frontal affections, in the region of the infra-orbital nerve, though an inflammation of the maxillary antrum may alone cause pain in the region of the latter nerve.

Acute affections of the accessory cavities furnish the only anatomical proof for the influenza neuralgia in the distribution of the fifth nerve. Causal relation between nasal hypertrophies and headache must be found with caution. There is only one form which can cause headache without other changes in the organism. This is the pressure exerted for years by a hypertrophy of the anterior end of the middle turbinal on the tuberculum septi.

POLLAK.

55. A confirmation on the ground of personal examination of accepted facts.

SCHEIBE.

56. In some cases the naso-lachrymal canal may be compressed in the middle meatus. The author therefore recommends removal of the swollen anterior end of the middle turbinate before commencing treatment on the eyes.

POLLAK.

57. GUYE publishes a case of aprosexia in a child with adenoids, though the hearing in both ears was normal, to show that aprosexia may follow nasal stenosis without accompanying deafness.

ZIMMERMANN.

58. In this paper BRAISLIN gives the statistics of cases of adenoids coming under his observation. Almost all of these cases applied for relief of ear symptoms. The author believes in removing these growths as soon as they are diagnosed and that the ear should be treated some time after the operation.

GORHAM BACON.

59. The following conditions, illustrated by observed cases commonly cause headaches : hypertrophic and atrophic rhinitis, spurs and deflected septum pressing upon the turbinals, perforation of the septum, polypi, fibroma, later stages of sarcoma, tertiary syphilis, rhinoliths, flies depositing their eggs, foreign bodies, suppuration from the accessory sinuses, and intranasal adhesions.

M. TOEPLITZ.

60. STEIN related a case of a man, æt. forty-nine, who had

suffered for three months from severe vertigo, which was permanently cured by turbinotomy of the right middle turbinal and subsequent cauterizations of the inferior turbinal. The left membrana tympani was cicatrized and retracted. All theories on vertigo, particularly the nasal reflexes, are fully discussed.

M. TOEPLITZ.

b.—METHODS OF EXAMINATION AND TREATMENT.

61. HEERMANN. An aseptic galvano-cautery. *Arch. f. Laryng.*, viii.

62. CORDES. A modification of the Schötz-Krause double chisel. *Monatschr. f. Ohrenhkl.*, No. 3, 1899.

63. KATZ. Nose and ear instruments. *Berl. klin. Wochenschrift*, No. 5, 1899.

64. GAREL. A new electric snare for removal of adenoids. *Ann. des mal. de l'or., du lar.*, xxv., 2.

65. BREITUNG. A new instrument for the faucial tonsils. *Münch. med. Wochenschr.*, No. 2, 1899.

66. SÄNGER. Has gargling any value? *Münch. med. Wochenschr.*, No. 8, 1899.

67. DU MESNIL DE ROCHEMONT. Should angina patients be isolated? *Münch. med. Wochenschr.*, No. 10, 1899.

68. HALL, ERNEST. A new supporting gauge for the nasal saw. *Medical Record*, Feb. 18, 1899.

61. The wires are free except near the end of the handle, where they run in a vulcanite sheath. To prevent short-circuiting the nasal speculum must be made of glass. ZARNIKO.

62. A plate for the thumb was placed on the handle to permit of easier manipulation on the right side. KILLIAN.

63. Three new instruments: 1. Movable nasal curette. 2. Movable caustic applicator—both for hypertrophic posterior turbinates. 3. Caustic probe, with gold crown-shaped attachment for ear and nose. MÜLLER.

64. To prevent hemorrhage GAREL has designed an instrument where the electric snare runs in a curve similar to that of Gottstein's curette. ZIMMERMANN.

65. This instrument is a knife, cutting forward, fastened to Krause's snare. SCHEIBE.

66. SÄNGER made experiments to see where the gargle fluid

reaches and found that the tonsils and posterior pharyngeal wall were not touched, except by a very small quantity which dropped down by gravity. Hence, in acute inflammations gargling should not be advised, for this reason, and also because it is not rational to move inflamed parts (soft palate and palatal arches). He recommends mopping the affected parts.

SCHEIBE.

67. In one month 18 cases in one ward, or 27 % of all the patients were taken ill ; in the two following weeks there were 19 more cases. The tonsils were red and swollen, follicular and lacunar inflammations, pseudo-diphtheritic membranes. In 3 cases articular rheumatism followed ; in 1 case each, nephritis, pericarditis, endocarditis, and alarming cardiac weakness. The author in future intends to place each angina patient in the infectious ward.

SCHEIBE.

68. In order to prevent the motor nasal saw from infringing upon the upper posterior pharyngeal wall, HALL adds a sliding gauge moved upon the supporting bar and fastened by a set-screw, so that with the collar placed against the upper lip of the patient the saw can be adjusted to any required distance into the nostril.

M. TOEPLITZ.

C.—OZÆNA.

69. CHOLEWA and CORDES. On ozæna. *Arch. f. Laryng.*, viii., 1.

70. BRUCK. The treatment of genuine ozæna. *Arch. f. Laryngol.*, viii., 1.

71. HECHT. Reply to preceding paper. Bruck's answer. *Ibid.*

72. MEISSER. Chamæprosopia, an etiological factor in ozæna. *Arch. f. Laryngol.*, viii.

73. MCBRIDE. The treatment of ozæna. *British Med. Jour.*, Feb. 11, 1899.

69. After an introduction this paper is divided into two parts. In the first CORDES describes the microscopical findings. Extensive metaplasia of the normal ciliated epithelium to keratosed flat epithelium ; marked round-cell infiltration, especially in the subepithelial layers ; slight fatty-cell degeneration, presence of many Mastzellen ; no peculiarity of the blood-vessels ; atrophy of the erectile tissue. The changes in the bony structure are osteoporosis, an independent primary process. CHOLEWA in the second

part concludes as follows : The osteoporosis, entirely independent of the changes in the mucosa, can be compared to osteomalacia. The changes in the bone then influence the mucous membrane in a peculiar way through changes in the blood circulation. The glandular secretion becomes more alkaline and suitable culture medium for saprophytes. Hereditary lues is not one of the causes. The tropho-neurotic nature of ozæna (the reviewer's hypothesis) is rejected by the authors, agrees more or less with the results of this examination, and Pommer has found a tropho-neurotic cause for osteomalacia, which, according to the authors, is related to ozæna process. ZARNIKO.

70-71. The controversy between BRUCK and HECHT is about the method of permanent tamponade of the nose with gauze recommended by Bruck. The latter finds this modification of Gottstein's methods excellent, with which Hecht disagrees. ZARNIKO.

72. Under the direction of Siebenmann, MEISSER has made measurements to discover a connection between ozæna and the form of the face. Of forty ozæna patients there were thirty-nine chamæprosopes and only one leproprosop ; while in the normal the average is about the same. In ozæna patients, the upper face as a whole, and also its several parts, belong to the chamæprosopic type. As all chamæprosopes are not ozæna sufferers, there must be another factor, which the author believes to be the congenital metaplasia of cylindrical to pavement epithelium. Both changes stand in no connective relation to each other ; they are congenital. If the one is wanting, the characteristic picture of ozæna is imperfect. ZARNIKO.

73. At a meeting of the Edinburgh Medico-Chirurgical Society held on Feb. 1, 1899, McBRIDE read a paper on the treatment of ozæna, with special reference to cupric electrolysis. The results in eight cases were given. McBride's general conclusion was that this method of treatment was probably the most successful yet suggested. ARTHUR CHEATLE.

d.—SEPTUM.

74. DOUGLASS, BEAMAN. Papilloma of the nasal septum. *N. Y. Med. Journ.*, Jan. 1, 1899.

75. CLARK, J. PAYSON. Sarcoma of the nasal septum. *N. Y. Med. Journ.* Jan. 7, 1899.

74. DOUGLASS found in a woman, æt. sixty-four, a warty growth, three-quarters of an inch in diameter, upon the right side of the nasal septum and behind the tubercle. The fully described microscopical examination, illustrated by four pictures, revealed it to be a true papilloma. The differential diagnosis from Hopmann's fibroma œdematosum is given. M. TOEPLITZ.

75. In addition to the sixty-two cases of nasal sarcoma collected until 1896, ten cases are found related. Only one, a woman, æt. thirty-eight, with alveolar sarcoma of the right middle turbinal removed with snare and curette, showed no recurrence for two years. CLARK reports two cases : 1. A man, æt. thirty-five, with bluish masses in the left nostril, which when removed recurred twice upon the septum near posterior border and necessitated the removal of the entire septum with an osteoid sarcoma upon it. After implication of the left orbit with destruction of the sight, and the development of cauliflower masses in the scar, death occurred. 2. A woman, æt. forty-two, showed a myxo-sarcoma attached to cartilaginous septum in the left nostril, nearly opposite the lower border of the middle turbinate. Most of the cartilaginous and part of the osseous septum were removed. No recurrence had taken place since June, 1897. In conclusion, Clark strongly advocated radical operation.

M. TOEPLITZ.

c.—TUMORS

76. MCKINNEY, RICHMOND. Papilloma of the nasal cavity. *N. Y. Med. Journ.*, March 4, 1899.

77. THORNER, MAX. A naso-pharyngeal polypus of enormous size. *Med. News*, Jan. 20, 1899.

78. THORNER. A case of adeno-carcinoma of the nose. *Arch. f. Laryng.*, viii.

79. DELIE, A. The operative treatment of fibrous polypi in the naso-pharynx. *Ann. des mal. de l'or., du lar.*, xxv., 3.

76. MCKINNEY reviews the literature on nasal fibroma, which invariably grows from the lower turbinal or septum. He reports a case of growth observed in a student, aged twenty-four, on the upper and anterior portion of the cartilaginous septum behind the tubercle, about the size of a coffee bean, raspberry-like, which, after removal with the snare and cautery, did not recur, and proved microscopically to be a fibroma papillare, or true papilloma.

M. TOEPLITZ.

77. The tumor removed from the naso-pharynx, a mucous polypus measured in its largest diameter $2\frac{3}{4}$ inches, in its greatest thickness $1\frac{3}{8}$ inches, and weighed one ounce and five drachms. It had been attached by a slender pedicle to the right lateral wall of the pharynx, just in front of the Eustachian orifice. The right nasal fossa was free after operation. M. TOEPLITZ.

78. Typical case of glandular carcinoma of the septum in a man aged forty-seven. ZARNIKO.

79. A fibroid tumor in a young person, attached to the right side of the pharyngeal roof without any processes extending into the surrounding cavities, was removed with the probe-pointed knife without unusual hemorrhage. ZIMMERMANN.

f.—ACCESSORY CAVITIES.

80. GROSSMANN. Contribution to the pathological histology of the antrum of Highmore. *Arch. f. Laryngol.*, viii.

81. KÖRNER, H. The accidental opening of the maxillary antrum after the extraction of a tooth. *Wien. med. Blätter*, Nos. 4 and 5, 1899.

82. RÖPKE. Radical operations in chronic catarrhs and supurations of the upper nasal accessory cavities. *Arch. f. Laryngol.*, viii.

83. GERBER. Empyema of the frontal sinus with disappearance of the entire anterior wall. *Arch. f. Laryng.*, viii., 1.

84. GIBSON, C. L. Empyema of the frontal sinuses and intracranial infection. *Four. Amer. Med. Sciences*, March, 1899.

85. SPICER, SCANES. Specimens of dead bone, polypi, and débris removed from a case of chronic empyema of antrum cured by radical operation in eight weeks. *Proceedings of the Laryngological Society*, London, Jan., 1899.

86. SPICER, SCANES. Case of cure of chronic empyema of maxillary antrum by radical operation. *Proceedings of the Laryngological Society*, London, Jan., 1899.

80. The author found in some polypoid hypertrophies from a maxillary antrum filled with pus, many so-called hyaline bodies in the subepithelial layer. He agrees with the views of Seifert and Polyak that they are derivatives of the round cells in the inflammatory infiltrate. ZARNIKO.

81. KÖRNER has observed five cases where, after extraction of

teeth or roots, the antrum was opened. In four of these cases no reaction occurred, except in one some secretion appeared for four weeks, and in another a somewhat more profuse though transient discharge. The author does not believe it possible to avoid the accidental opening of the antrum. If the opening is suspected it is well to examine with a fine sterile probe, and pack with gauze.

POLLAK.

82. RÖPKE thinks in the chronic diseases of the frontal cavities the anterior ethmoid cells are also affected. With the idea of exposing these latter cells, he first operates according to Kuhnt's method. After removing all disease he makes a broad opening into the ethmoid cells, cures these as far as it is necessary, and makes a broad communication between the nose and the frontal cavity. He finally introduces a strip of gauze, and unites the wound except at one point. In bilateral affections the operation is carried on at the same sitting. After removal of the frontal septum and cutting off of the prominent nasal process of the frontal bone, excellent cosmetic results have followed. The after treatment is simple. The gauze strip may be left off after three to five days. All secretion has stopped on the eighth or tenth day at the latest. In one case out of twelve, slight secretion kept up for two months. Transient diplopia was noted in three patients.

ZARNIKO.

83. GERBER's patient had suffered from ozæna since youth, acquired syphilis (three abortions at the third and fourth month), and later had a tertiary syphilide of the nose (defect in vomer). A specific periostitis and necrosis of the anterior wall of the frontal sinus followed, with secondary empyema of the frontal sinus (long-standing headache and tenderness, etc.). The anterior bony wall was completely eroded, and after a trauma pus broke through.

ZARNIKO.

84. A discharging fistula remaining after trepanation of the left frontal sinus at the inner angle of the left orbit, persistent headache, more marked of late on the right side, necessitated an operation. Through a horizontal incision along the left eyebrow the left sinus was freely scraped except its posterior softened wall, the spoon passing through the soft septum into the right sinus which was filled with pus. A drainage-tube was introduced into the cavity from the nose upward. Two days after the operation meningitis developed. Death ensued nine days after the operation. The autopsy revealed congestion of the pia mater, pus in

the pia at the base of the brain, especially over the pons and cerebellum. Cerebral wall of the right frontal sinus presented a circular opening, one inch in diameter, with smooth edges, the dura above and posteriorly thickened and covered with granulations and blood. The right cribriform plate was carious. An angular piece of bone, $\frac{3}{4}$ inch above the left sinus pressed against the crista galli. Irrigations infected the brain cavity through the structural defect in the right sinus.

M. TOEPLITZ.

85. The title sufficiently indicates the chief points of the case.

ARTHUR CHEATLE.

86. A man, aged twenty-three, had been troubled with fœtor and suppuration from the left nostril for eight years, the origin being the first molar tooth. At the operation, a large gap was found in the anterior bony wall of the antrum, and in the membranous structure filling this gap were small loose, thin, bare scales of bone. The probe and finger passed easily into the cavity, which was filled with thick inspissated pus, cheesy débris, polypi, and granulation tissue. The finger passed into the cavity with the slightest pressure met the finger passed into the nostril, breaking through the membranous portion of the absorbed inner antral wall into the inferior meatus. A drainage-tube was passed into the nose and cut off near the nostril and the muco-antral opening sutured. The tube was removed on the fifth day. All fœtor and pus ceased at the end of three weeks.

ARTHUR CHEATLE.

g.—OTHER NASAL AFFECTIONS.

87. GOODALE, J. L. The histopathology of hypertrophic rhinitis in children. *Four. Amer. Med. Assoc.*, March 11, 1899.

88. CORNICK, BOYD. Epistaxis. *Ibid.*, March 25, 1899.

89. VANSANT, E. LARUE. The suprarenal gland of the sheep in nasal surgery. *Phila. Med. Jour.*, Feb. 25, 1899.

90. BERENS, T. PASSMORE. The rebuilding of a nose without the use of an artificial bridge. *The Laryngoscope*, March, 1899.

91. STOKES, SIR WILLIAM. A clinical lecture on the rhinoplastic operation. *Brit. Med. Jour.*, Feb. 11, 1899.

92. CAIRD, F. M. and GUY, WM. A case of syphilitic destruction of the nose and palate in a young man. Appearance greatly improved by artificial means. *Ibid.*, Jan. 28, 1899.

93. KAYSER. Congenital closure of the posterior choanæ (choanal atresia). *Wiener klin. Wochenschr.*, No. 11, 1899.

94. RAPAUER. On the treatment of coryza. *Klin. therap. Wochenschr.*, No. 1, 1899.

87. GOODALE presents the histologic descriptions of three cases of hypertrophic rhinitis in children between the ages of eight and ten years. The sections of the removed hypertrophy of the first case show a furrowing of the mucous membrane, which varies in thickness from three to four cell layers at the apex to fifteen to twenty at the bottom of the furrows. Epithelium at the apex has no cilia. In the intercellular spaces were a few polymorpho-nuclear neutrophiles. The loose connective tissue below the mucous membrane was three to four times increased, an irregular, delicate fibrous network containing clusters of glands, a few blood-vessels, sinuses, and free cells, the latter submucously, the glands more deeply situated. Anteriorly the reticulum was loosest, posteriorly more compact, and the vessels, glands, sinuses more numerous. The free cells are found near the blood-vessels, glands, and over the connective tissue, and represent leucocytes and plasma cells, also a few eosinophilic polynuclear leucocytes and quite a number of Mastcells. The histologic description of the other two cases differs somewhat, but not essentially, from the foregoing.

M. TOEPLITZ.

88. CORNICK uses a dry plug of prepared sponge, of the size of the little finger of a twelve-year-old boy, soaked in boiled water, squeezed dry, and inserted along the nasal floor.

M. TOEPLITZ.

89. VANSANT uses a freshly made watery solution of the capsule, or ten drops of the glycerin extract of the fresh gland, in a drachm of boric-camphor solution, to be applied after a five per cent. solution of cocain or a four per cent. of eucaïn, in order to produce intense ischæmia of the parts as great aid in nasal operations.

M. TOEPLITZ.

90. The very ugly deformity consisted in a flattened and broad bridge, the line of the septum forming an irregular obtuse angle with the apex pointing to the right. The columna was turned to the right side and occluded the right naris. The body of the septum was deflected to the left and its upper half adherent to the wall of the vestibule. Under anæsthesia the soft parts were divided from the septum, then both nasal bones separately broken with an Adams forceps from their attachment with the superior

maxilla and frontal spine and, in addition, crushed by a bar of steel heavily struck with a mallet. The perpendicular plate of the ethmoid and the rest of the septum were also broken with the Adams forceps. Cork splints inside and a plaster cast outside held the fragments in place. Complete recovery with good cosmetic result took place without reaction after operation.

M. TOEPLITZ.

91. In his lecture delivered in the Meath Hospital, Dublin, Sir WM. STOKES related two cases recently operated on him for re-formation of the nose. The first was a woman, aged twenty-seven, who had lost her nose from, most probably, syphilis. The procedure adopted was in most respects similar to one described in Treves's *Operative Surgery*. In order to assist in preventing flattening of the new nose two small leaden plates were placed, one on each side, and approximated by passing silk sutures horizontally through the tissues. These plates and sutures were left in situ for three days; the result was satisfactory. The second was a boy, aged nineteen, who had suffered with lupoid ulceration. The following novel method was adopted: The columella not being affected, an incision was begun a little to the inside of the right ala and carried across the extremity of the nose to a corresponding point on the left side, the incision extending as high up as the point corresponding to the lower margins of the nasal bones, and passing through all the tissues into the anterior nares. The bridge of tissue so detached was then drawn down and kept in that position by a small ivory buttress, which separated it from the tissues of the upper part of the nose. The gap thus formed was somewhat lozenge-shaped, and to fill it two triangular-shaped flaps were dissected up, one on each side, from the cheeks, with the bases above and the apices below, and turned downwards and inwards, their bases meeting in the middle line, where they were carefully sutured. The upper margins of the transplanted flaps were also carefully sutured to the tissues above, and the lower margins to the detached bridge below. The ivory buttress was left in for three days. In order to obliterate the defects caused by the detachment and transplantation of the flaps a sliding plastic operation was performed. The result was most satisfactory.

ARTHUR CHEATLE.

92. At a meeting of the Edinburgh Medico-Chirurgical Society held on January 18, 1899, CAIRD and GUY showed a young man in whom syphilitic destruction had overtaken the soft parts of the

nose, upper lip, cheeks, and palate ; while the vomer, inferior turbinated bones, nasal bones, and nasal processes of the maxillæ were completely destroyed. Extensive destruction of the palatal and alveolar processes of the maxillæ had also taken place, and all the upper teeth were lost, the lower lip and teeth projecting far beyond the remains of the upper lip. The appearance of the patient was "horrifying." A nose, with cheeks and upper lip were fitted and retained in place by means of a spectacle frame. The apparatus being made of white vulcanite, was painted in oils, had a mustache attached, and the bridge of the spectacles vulcanized in. An artificial palate, into the middle line of which a strip of springy gold was vulcanized, was then made ; the gold strip being bent in such a way that its extremity, sliding in a gold box or catch at the back of the upper-lip part of the nose-piece, retained the palate in place. At a distance of a yard or two one failed to detect the artificial nature of his facial condition.

ARTHUR CHEATLE.

93. KAYSER observed a case of one-sided choanal atresia in a man twenty-four years old. The palatal arch was rather high and asymmetrical ; the raphe turns to the right. Posterior rhinoscopy revealed the left choana to be free, the right completely occluded by a partition covered with pale red mucous membrane several millimetres distant from the edge of the choana. No subjective symptoms ; loss of smell on that side. Operation was not allowed.

POLLAK.

94. RAPAUER recommends in acute coryza irrigating the nose with a strong permanganate of potash solution. The mucous membrane is then to be cleansed mechanically with some cotton dipped in this solution with the finger !

POLLAK.

SOFT PALATE, PHARYNX, AND BUCCAL CAVITY.

95. SWEENEY, GILLIFORD B. The faucial tonsil, its sphere as an agent of systemic infection. *Four. Amer. Med. Ass.*, March 25, 1899.

96. SMITH, EDGAR D. Tuberculous ulceration of the soft palate and adjoining soft tissues. *N. Y. Med. Jour.*, Feb. 11, 1899.

97. GRIFFIN, E. HARRISON. Polypus of the uvula. *N. Y. Med. Jour.*, Jan. 28, 1899.

98. ABRAHAMS, BERTRAM. Rheumatic tonsillitis. *British Med. Jour.*, Feb. 4, 1899.

99. TILLEY, HERBERT. Epitheliomatous ulceration of nasopharynx. *Proc. Laryngol. Society*, London, Feb., 1899.

100. BANKS. Faucial tumors. *British Med. Jour.*, Feb. 4, 1899.

101. ROBERTSON, W. G. AITCHISON. On tonsillar calculi. *British Med. Jour.*, Jan. 7, 1899.

102. FEIN. The etiology of cleft-palate and posterior palatal fissures. *Wien. klin. Wochenschr.*, No. 4, 1899.

103. TANDLER. On the embryology of uranoschisma. *Wien. klin. Wochenschr.*, No. 7, 1899.

104. FINDER. Pathology of the tonsil. *Arch. f. Laryng.*, viii.

105. MACHOL. A case of septicæmia starting from the pharyngeal tonsil. *Deutsche med. Wochenschr.*, No. 10, 1899.

106. CAZ. Glosso-epiglottic phlegmon. *Arch. f. Laryng.*, viii.

95. SWEENEY contends that the faucial tonsil while in a state of inflammation, is a frequent and common source of morbid processes which ultimately affect the entire human economy. It is thus the starting-point for diphtheria, scarlatina, follicular tonsillitis, acute rheumatism, tuberculosis, typhoid and malarial fevers.

M. TOEPLITZ.

96. The rapidly progressing ulcerations are in the majority of cases secondary to tuberculous infiltration of the lungs, and the palate and its neighboring tissues are infected by the tuberculous excretions. They are preceded by separate miliary tubercles (often mistaken for small vesicles), which break down, form small ulcers, and coalesce on the second or third day, very rapidly now forming a large ulcer. A few are primary from tuberculous dust settling upon an abraded mucous membrane. The patient rapidly loses strength and dies from exhaustion. The ulcers are satisfactorily treated with a mixture of equal parts of lactic acid and glycerin. SMITH reports five observations of his own.

M. TOEPLITZ.

97. GRIFFIN accidentally observed in a man aged forty, at the end of the slightly enlarged uvula, a polypus an inch in length and half an inch in diameter, which had never caused any disturbance. Tickling and hawking, usually ascribed to an elongated uvula, can be easily explained by accompanying obstructive nasal catarrh and the removal of the uvula is mostly unnecessary.

M. TOEPLITZ.

98. At a meeting of the Clinical Society of London, held on January 27, 1899, ABRAHAMS drew the following conclusions from his observations :

1. The more common varieties of rheumatic sore throat fall into two main categories, faucial erythema and tonsillitis proper.

2. Faucial erythema is most common in adults, rheumatic tonsillitis in children, in whom it usually assumes the follicular type, quinsy being more frequent in older subjects.

3. Faucial erythema is an initial manifestation of acute rheumatism, tonsillitis may be the actual primary lesion.

4. Many cases are now definitely on record in which endocarditis has followed a non-scarlatinal tonsillitis unaccompanied by joint lesions. In numerous other instances the tonsillitis has immediately preceded an attack of arthritis or of chorea.

5. The presence of the same micro-organisms in the tonsils, joints, blood, and urine is evidence in favor of the participation of pyogenic cocci in the etiology of rheumatism.

ARTHUR CHEATLE.

99. A man aged fifty-five complained of difficulty of breathing through the nose, unpleasant discharge into the mouth, and general weakness. The palate was immobile, almost vertical in direction ; its free borders were so thickened and congested that only a small aperture just sufficient to admit the index finger was present. On introducing the finger, ulceration could be felt. An enlarged gland was present under the upper part of the left sterno-mastoid.

ARTHUR CHEATLE.

100. At a meeting of the Liverpool Medical Institution, held on January 26, 1899, BANKS described three cases of removal of tumors lying external to and behind the tonsil.

1. A young man in whom a tumor had been growing for many years, causing a marked projection behind the vertical ramus of the jaw. Removed by the mouth, through a vertical incision. Shelling out easily. An adeno-fibroma.

2. Similar case in a woman aged forty ; history of two years' growth. A preliminary laryngotomy was done. The tumor shelled out easily.

3. A woman twenty years of age. A swelling had appeared behind the right tonsil eight or ten weeks before admission, and had been steadily, and rather rapidly increasing, great deal of pain, and difficulty in swallowing. Preliminary laryngotomy. Free incision over tumor, which was found to be adherent to bone at

its farthest off point, necessitating slitting up of the cheek and division of the lower jaw. When the growth was torn away it was found to be adherent to the side of the body of the third cervical vertebra and to the base of the skull. Sarcoma.

ARTHUR CHEATLE.

101. ROBERTSON'S patient was a man aged fifty, who six years previously began to suffer from repeated attacks of tonsillitis. Three years previously the submaxillary glands on the right side suppurated. For the last two years his health had been good. At the end of June, 1898, he experienced a fulness in his throat, and inability to drink fluids as rapidly as before. In the night of July 3d, he was awakened by a feeling of suffocation, and coughed up a calculus from the right tonsil somewhat oval in shape, broader at one end than the other, the greatest length being $1\frac{3}{4}$ inch, and greatest breadth $1\frac{1}{2}$ inch. Weight 26.8 grammes. The layers of which the stone was composed were arranged concentrically.

Chemical composition :

Organic matter.....	18.40 per cent.
Inorganic matter.....	81.60 "
Phosphoric anhydride.....	50.00 "
Calcium and magnesium oxides....	28.20 "

This is the largest tonsillar calculus found among fourteen recorded cases. The whole subject is dealt with in the paper.

ARTHUR CHEATLE.

102. Fissures in the body of the fœtus may arise from the interposition of any body. The origin of the development of the pharyngeal tonsil can be traced to fœtal life, and as enlarged pharyngeal tonsils and posterior palatal fissures are usually associated, an explanation for the origin of the latter is furnished.

POLLAK.

103. Opposed to this, TANDLER thinks that the pharyngeal tonsil has nothing to do with the etiology of the total or partial palatal defect. On the other hand, the tongue can play an important part. He examined some cases associated with mikrog-nathia and explains uranoschisma as follows: the tongue cannot withdraw at the proper time from the upper part of the common nasal-buccal cavity, but remains in place against the septum, and so prevents the union of the two sides of the palate.

POLLAK.

104. Histological examination of: (1) retention cyst, the so-called follicular abscess or cheesy foci; (2) a large benign tumor,

pendulous fibro-adenoma; (3) a tonsil with broad condylomata.

ZARNIKO.

105. A man with chronic bronchitis and emphysema was taken ill with dysphagia and malaise. The right tonsil was swollen but without a membrane. Two days later, with a severe chill erysipelas of the nose set in, but abated after a few days. A painful swelling appeared below the right ear, and after eight days softened; was incised, pus evacuated. The left wrist then became painful, and patient had another severe chill. Hearing became very much affected with inflammatory signs, and two weeks later patient died after another severe chill. No bacteriologic examination or autopsy. The author believes that the diagnosis is correct; septicæmia without recognizable external trauma.

NOLTENIUS.

106. CAZ reports two cases where severe dysphagia set in with fever and malaise caused by circumscribed inflammations of the submucous tissue in an epiglottic fossa. In the first case pressure on the epiglottis caused dyspnœa and necessitated tracheotomy. In the second, the symptoms abated under antiphlogistic treatment.

ZARNIKO.

Contents of the last volume of the *Zeitschrift für Ohrenheilkunde* (German Edition of these ARCHIVES).

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1. A. HARTMANN (Berlin). On the intestinal disturbances produced by otitis media of infants (translated in Nos. 2 and 3, vol. xxviii. of these ARCHIVES).

2. O. KÖRNER (Rostock). a. The action of sea-climate and of surf-bathing on aural affections and hyperplasia of the pharyngeal tonsil. b. A contribution to the technic of perforating the maxillary antrum. (Translated in Nos. 2 and 3, vol. xxviii.)

3. E. JOËL (Gotha). On congenital closure of the choanæ (translated in No. 1, vol. xxviii.).

4. OLE BULL (Christiania). The application of hydrochloric acid in affections of the bony walls of the tympanic cavity and the meatus (translated in No. 1, vol. xxviii.).

5. EULENSTEIN. Movable spongy osteoma of the cartilaginous portion of the external auditory canal (translated in No. 1, vol. xxviii.).

6. TEICHMANN. A contribution of diplacusis (translated in No. 1, vol. xxviii.).
7. RÖPKE (Solingen). The operation for otitic brain abscess with special reference to its curative value (translated in Nos. 2 and 3, vol. xxviii.).
8. WAGNER (Bâle). Hearing before and after the radical operation.
9. HYNITZSCH. Microscopic examination of the hypertrophic pharyngeal tonsil.
10. WEX (Rostock). Normal and pathological histology of the pharyngeal tonsil.
11. LESTER and GOMEZ. Observations made in the caisson of the new East River bridge as to the effects of compressed air upon the human ear (translation from the English Edition).
12. GURANOWSKI. A case of double external auditory canal.
13. WOLF (Frankfurt). On the examination of hearing with the speech.
14. EULENSTEIN. Percussion of the mastoid process (translated in Nos. 2 and 3, vol. xxviii.).
15. MÜLLER. The effect of artillery firing on the ears (translated in this number).
16. RUEDI. The hearing in microtia with atresia auris congenita.
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18. SIEBENMANN. Multiple areas of cancellous tissue in the labyrinth capsule, found at autopsy of a case of progressive deafness.
19. TEICHMANN. A contribution to the statistics of the dangerous complications of suppurative ear diseases and of operations on the mastoid process (translated in Nos. 2 and 3, vol. xxviii.).

ARCHIVES OF OTOTOLOGY.

A CASE OF INFLUENZA FOLLOWED BY MASTOID ABSCESS, SINUS THROMBOSIS, MENINGITIS, AND DEATH. AUTOPSY.

BY FRANK ALLPORT, M.D., CHICAGO, ILL.

A. E., aged seventy-six. Two years ago fell through a hole in his barn loft to the floor below. Struck on his head. Received scalp wound. Soon fever and delirium followed. Recovered, but family says his mental condition was never the same again. His memory became very bad, and he appeared dazed and irrational at times. In January, 1899, contracted severe influenza, accompanied with delirium. During the attack had abscess of left ear, followed by painful and swollen mastoid for weeks. Ear was simply syringed by medical attendant. Consulted me July 13, 1899. Found some soreness of mastoid on pressure. Fistula of lower, posterior bony meatus, emitting copious, foul pus. Membrana tympani intact. Consultation with Dr. T. Melville Hardie. Operation advised and consent given. Admitted to St. Luke's Hospital, July 26th. Temperature 99.2°. Pulse 89. Feeling quite well, and good appetite.

Operation July 28th, assisted by Dr. Hardie and Dr. W. H. Allport. The second stroke of chisel found pus. Entire outer plate of mastoid removed. Mastoid cavity full of pus and granulation tissue. Cell walls completely broken down. Entire cavity thoroughly curetted. Bony covering of lateral sinus necrosed and sinus exposed, but apparently healthy. Good recovery from operation. Patient apparently making uneventful recovery. Until August 12th, nothing of any note occurred. Temperature varied from 98.4 to 99.6°. August 12th: temperature, 97.6°. Does not feel so well. Restless at night. Pain in stomach, otherwise well. Each day temperature struck 97° and a fraction. August 17th: talkative, and speech occasionally irrational. August 18th: these conditions exaggerated. Seen by Dr. Archibald Church,

who expressed favorable prognosis and advised strychnia and nitro-glycerine. August 19th: more talkative and delirious. Temperature from 97.6 to 99°. Pulse from 76 to 82. August 20th: distinctly delirious. Temperature from 98.2 to 99°. Pulse from 68 to 92. August 21st: much worse. Temperature from 99.4 to 99.6°. Pulse from 80 to 112. Seen by Drs. Church, J. E. Owen, and W. H. Allport. Dr. Hardie not in town. Diagnosis, acute meningitis. Prognosis, unhesitatingly bad. The only hope for patient is thought to be the evacuation of the cerebral abscess (should any exist). No focal symptoms. No optic neuritis. Skull trephined that afternoon, over temporo-sphenoidal lobe. Dura inflamed. Probing in various directions with grooved director disclosed nothing. Wound closed by skull button and sutures. Site of original mastoid operation found healthy. August 22d: quieter, but always delirious. Temperature from 99.6 to 102°. Pulse from 90 to 114. August 23d: same condition. Temperature from 100 to 100.8°. Pulse from 88 to 120. Same condition. Temperature from 99.6 to 101°. Pulse from 112 to 122. August 25th: same condition, only growing worse each day and passing feces and urine involuntarily. Temperature from 100.8 to 102.6°. Pulse from 118 to 136. August 26th: died 1 A.M.

Autopsy.—By Dr. D. N. Eisendrath. Present: Dr. J. E. Owen, myself, and resident hospital staff. Original mastoid operation area found healthy. At external site of trephine wound a drop or two of pus found, otherwise entire area of trephine operation, even into the brain, perfectly healthy. Dura is completely adherent to skull by old adhesions. Dura and pia deeply congested. Posterior to wound of operation pia and arachnoid show hemorrhagic suffusion. Slight puriform thrombus in left lateral sinus. Careful search made for cerebral abscess, but none found.

Remarks.—It seems strange that after apparently making a good recovery, he should suddenly develop meningitis and proceed to a rapid death. The case shows that a subnormal temperature does not always indicate a cerebral abscess, and may exist with an intense meningitis. The extremely small purulent thrombus found was not thought to have had anything to do with his death, and it surely must have developed *after* the first operation. If, however, it played a part in the fatal result, it shows that purulent thrombus

is not always accompanied by its characteristic symptoms, such as the up and down temperature and pulse, chills, etc. The query naturally arises, as to whether the old fall on his head had anything to do with the fatal result. The adhesions between the dura and skull probably indicate a pre-existing meningitis, which may have lingered, in a latent condition, only to be revived by operative procedures upon an old and debilitated patient. It is of course evident, that had it not been for the drainage from the masto-meatal fistula the case would have developed to the operating point much sooner.

MULTIPLE TUBERCULAR TUMORS OF THE SKULL AND BOTH TYMPANIC MEM- BRANES.

BY DR. H. FREYSING, ROSTOCK.

Translated and Abridged by Dr. E. M. Cox, New York.

(From Band xxxii., S. 369, 1898, of German Edition.)

ON account of its rarity and interest the following case seems worthy of comment.

W. W., painter, aged nineteen, entered the clinic July 26, 1897. Heredity and family history very good. Patient has hitherto been well, except for measles six years ago, when he had suppuration in one ear, which one he does not know. Four months before admission, he noticed, on his right leg, a hard, rounded, painless tumor about $1\frac{1}{2}$ inches in diameter. He had stiffness of the neck, and after a time painless swellings appeared behind the right ear and on the left side of the forehead. There was some suppuration in each ear. The patient's general condition remained fairly good, and he had no fever. There was a small painless swelling near the inner canthus, and a larger fluctuating, tense, and immovable swelling between the left temple and the frontal eminence. Another tumor appeared behind the right mastoid, and reached the size of half a hen's egg. It appeared to be adherent to the sterno-mastoid muscle.

The left drum membrane was changed into a uniformly bright red, apparently granulating mass in the lower part of which there was a perforation. Malleus cannot be made out. Some odorless pus in the auditory canal. The right membrana is cloudy and dull. In its posterior third there are two circumscribed grayish-yellow swellings which run over upon the wall of the canal. Puncture of these swellings brought no blood or secretion; they were evidently solid. The hearing in the right ear was

much better than in the left. No cough or other evidences of pulmonary or cardiac disease.

July 26, 1897.—The tumor behind the mastoid was removed by Professor Körner. During its removal the growth was torn, and discharged odorless atheroma-like material, and showed an interior lined with dirty granulation tissue. Several superficial chips of bone were removed for examination. The small masses in the right membrana were then removed with forceps, and all the material was found, upon examination, to be tubercular.

Normal course. Wound behind the ear healed in fourteen days.

August 2d.—The growths on the forehead and at the root of the nose were removed. They were similar to the first mass and proved to be tubercular.

September 19th.—The wounds were finally healed. The masses in the drum membranes, parts of which only remained on the right side, were treated with 25 per cent. lactic acid and with weak chromic acid and airol. They slowly disappeared.

November 12th.—There were visible in the right membrana only two somewhat elevated scars, otherwise it was normal. The left drum membrane was much improved in appearance, looked smooth and shining, and the berry-like prominences have become smaller. Hearing on the *left*, $36 = 1.50 m$, $100 = 0.30 m$; on the *right*, $22, 36, 48$ more than $7 m$, $100 = 4 m$. The hearing is thus much improved on both sides. All the operative wounds are healed and painless, and there is no regeneration of bone where the forehead growth was removed. There was no change in the lungs and the general condition was very good; there was a gain in weight.

In January, 1898, the hearing was: *left*: $66 = 5 m$, $22 = 4 m$, $44 = 2\frac{1}{2} m$, $100 = 2 m$; *right*: $66 = 7 m$, and more, $100 = 6 m$. A careful microscopical examination of all the specimens was made by Dr. Ricker of the Pathological Institute, and all were tubercular except the bone splinter.

We have in this case an instance of multiple tubercular tumors of the skull and both drum membranes pursuing a relatively mild course.

After six months there was no recurrence, and the patient's general condition was good.

We have been, so far, familiar with tubercular nodules in the drum-membrane in the course of an acute miliary tuberculosis in children, or in cases of chronic tuberculosis in

adults, with rapid degeneration of the infiltrated regions (Schwartz). The term "tubercular tumor" is used in a clinical sense in this case. In the skin, tuberculosis sometimes appears in the form of tumors, for instance in "scrophuloderma," which behave like granulation masses, usually with a central degeneration, forming "tubercular" ulcerations. These neoplastic masses, except for their site, are exactly like the masses in the case under discussion. Scrophuloderma is rarely primary. Doutrelepon (1892) reported three cases, and pointed out some difficulties in diagnosis. In all these cases the growths were upon the face and were cured by operation. Bacilli were demonstrated in two of them. The same writer in 1894 described a six-year-old girl with twenty-nine cutaneous growths in various parts of the body. They were reddish-brown, nodulated, covered with crusts, and microscopic examination showed tuberculosis. Doutrelepon concludes that this form of tuberculosis does not have the same tendency to recur that is seen in lupus after scraping out of the ulcerations. Riehl and Wick report similar cases.

The so-called tuberculosis cutis verrucosa is to be mentioned in this connection. It is usually benign, but persistent. Knickerberg collected a number of cases, also Jadassohn and Thimm. Tuberculosis of mucous membranes occurs in various organs with lesions like those in this case. Schäffer and Chiari have collected cases of "tuberculoma" of the nasal mucous membrane. The growths were usually easily-bleeding, granulating masses, without any particular tendency to degenerate. Whether they originated in the mucous membrane or perichondrium is undecided; the latter is, however, always involved.

According to Koschier, the tubercular tumors of the nasal mucous membrane in their occurrence and histology resemble the so-called scrophulous lymphomata.

TUBERCULAR TUMORS OF THE LARYNX.

According to Avellis these growths may be described as having these characteristics:

I. Tumors which have all the characteristics of a true neoplasm, and appear as papillomatous or fibromatous

growths on the vocal cords, or as solitary masses covered with mucous membrane.

II. The tumors are often seen in cases without pulmonary disease, and may, therefore, be primary in many instances.

III. The most frequent sites are in the sinuses of Morgagni, and on the true or false vocal cords.

IV. They rarely ulcerate, and their contents show giant cells and tubercle bacilli.

V. Their course is chronic.

VI. They occur in early life.

VII. Operative removal is always beneficial and sometimes curative.

Jores describes a case in which laryngectomy was done for supposed carcinoma. Although the glands were diseased, there was no serious involvement, and the writer called the case one of "tubercular infiltration of the laryngeal mucous membrane."

Kramer and Hartmann describe similar growths in the rectal mucous membrane, and Hattute mentions a case with stricture of the pylorus.

Fränkel and Franqué give cases of much the same sort of growth in the uterine mucous membrane.

Askanazy, Neelsen, and Goldschmidt mention the disease in the pleura.

Israel describes similar lesions in the peritoneum.

Several authors describe tubercular tumor in muscles. They are usually benign, and sometimes resemble lipomata. This form of disease is exceedingly rare in the kidney as a primary growth.

The central nervous system is rarely affected; when it is, children are usually the patients. Bach (Würzburg) describes a case of granulation-tumor of the iris. Haug describes cases in the external ear.

We may consider that this form of tubercular tumor occurs in two forms. The first is of a somewhat soft granulation-like consistence, the second is denser, and may be of cartilaginous hardness. We find the growths in almost every organ. They are benign, and do harm only mechanically.

OTITIS MEDIA IN EARLY CHILDHOOD.

BY PROF. A. BARTH, LEIPZIG.

Abridged Translation (from Band xxxii., S. III, 1898, of German Edition) by
Dr. ADOLPH O. PFINGST, Louisville, Ky.

THIS subject was suggested to me on account of its importance and because of the obscurity which still exists in this field of work. Its importance becomes apparent when the frequency of middle ear involvement in children ill with other affections is considered. Of 600 sick infants examined before and after death, 80 per cent. were found to have a lesion of the middle ear.

My study of the subject, limited to children in the first three years of life, included 48 patients seen in 1896 and 78 seen in 1897. All but 7 of the 48 showed evidence of inflammation of the middle ear of greater or less degree. In 5 of the cases the ear was normal and in 2 the external auditory canal was inflamed. Of the infants seen in 1897, 19 were in their first year, 29 in the second, and 30 in the third. In all but 3 there was a discharge of pus from the ear. In the remaining 3 the middle ear was inflamed but the drum was intact. In 9 of these cases the mastoid cells had to be opened. Although without complete record of the cases occurring in 1896, the operation was, as far as I remember, performed three times in that year. A noteworthy feature of the cases recorded in 1897 is the frequency with which spontaneous perforation of the drum had occurred. Autopsies have shown that the drum usually remains intact in most of the cases of inflamed middle ear.

In the examination of children I have them, by preference, in the erect posture, held in proper position upon the lap of an assistant. Occasionally the examination was made in bed in the recumbent position. Where it was possible, reflected rays from a Welsbach light were employed, otherwise from a lamp. Difficulty was sometimes experienced in seeing the drum on account of a narrowing of the auditory canal or on account of the presence of lanugo which necessitated the use of a narrow speculum. For the removal of cerumen or epithelial scales I prefer the syringe to the use of forceps and cotton probes. An astounding observation in the examination of these infants was their thoroughly good behavior. It has been my experience that they cry when they are placed in position and held, but as soon as manipulation of the ear is begun they almost invariably quiet down at once—unless, of course, the manipulation is painful. Upon releasing them, they again begin to cry.

It seems that in early childhood the more remote parts of the ear are not involved during acute middle-ear inflammation as they are in adult life. In fact, I would hesitate to open the mastoid cells in a child if the only symptoms of mastoid inflammation were a swelling and redness of the upper and posterior portion of the auditory canal. While some authors claim that it is frequently impossible to see the drum-membrane of a child, this has not been my experience. The upper portion is often horizontal in children and apparently continuous with the upper wall of the ear canal, but some portion of the drum can always be brought to view, unless unusual abnormalities exist. Some part of the upper segment can also be seen, as a rule, notably the short process of the malleus. Though the middle ear may be inflamed and contain pus, the drum often shows little or no alteration outside of a bulging at some part. The drum may or may not be injected. Sometimes the fluid in the tympanum can be seen through the drum; again the drum may become infiltrated with the fluid and take on a turbid appearance. In rare instances a perforation may not be detected, as it is possible for a small hole in the drum to be obscured by the infiltration of the membrane and

desquamation of its epithelium. In these cases the diagnosis will have to rest upon the presence of a pulsating reflex on the fluid in the bottom of the external ear canal and upon the character of the discharge. Even these common signs may not be present, in which case an immediate diagnosis is not possible.

However, if there are symptoms of inflammation of the external auditory canal, the possibility of a middle-ear affection should not be overlooked, as it is well known that the pus of a neglected case of otorrhœa is a frequent cause of inflammation in the ear canal. In such cases careful watching and cleansing of the canal will clear up the diagnosis in a few days.

In young children with otorrhœa, without apparent complications, I have, under rational treatment, nearly always brought about a rapid cure, and I cannot recall a single instance in which severe complications followed acute otitis media. This may, in a measure, be due to the personal attention that I give the cases. I have them, as I also do all simple cases of otorrhœa, report to me every day for irrigation, which gives me the opportunity to insure proper cleanliness, and at the same time see complications soon after arising, and to institute proper treatment. The large number of complications of middle-ear abscess which we encounter are, to my mind, due very largely to neglect. We will continue to see them with the same frequency as long as physicians are so prone to look upon these cases as trivial affections. In a general way it may be said that it is nearly always possible to expose the drum-membrane to view, and recognize its normal condition, and mostly to detect the existence of inflammation of the middle ear, but that it is not easy to foresee the outcome of a diseased middle ear, and its subsequent effect upon the general condition of the child.

It would not be amiss in a treatise on middle-ear troubles to review the sources of the infection in these cases. Although it is universally believed that infection may take place through the circulatory system, there is no doubt that in by far the greatest number of instances the infecting

elements pass into the tympanum through the Eustachian tube. They reach the tympanum either by an extension of a specific inflammation along the mucous membrane as in diphtheria, scarlet fever, etc., which usually results in an acute process, or through foreign substances which find their way into the tympanum by way of the Eustachian tube, notably through water forced into the tympanum during bathing, or with a nasal douche. Lately the belief that the infecting elements reach the tympanum through the blood has grown because of the infrequent presence in the middle ear of the germ specific of the primary inflammatory trouble in the naso-pharynx, *e. g.*, the diphtheria bacillus in diphtheria. More frequently the pus of the middle ear contains pneumococci, pneumobacilli, or streptococci. However, if we stop to consider that in acute inflammation of the naso-pharynx the ear complication does not develop, as a rule, until the primary inflammation has almost or entirely subsided, the theory of infection through the circulation does not hold. Infection by this channel would set up inflammation simultaneously with, or soon after, the inflammation of the site of infection. I have pictured the process about as follows: the inflammation extending from the naso-pharynx swells the mucous membrane of the tube, thereby closing its lumen. Germs harbored in the tube or the naso-pharynx near the tube at the time (we know that these parts always carry many varieties of pathogenic germs) find their way into the tympanum, while the bacteria specific of the inflammation in the naso-pharynx which reach the opening of the tube after it is swollen are excluded. By the closure of the tube its normal function as a passage for air is interfered with. The growth of the germs in the tympanum and the consequent inflammatory action are thereby favored. The frequency with which middle-ear affections occur in children would lead to the inference that anatomical conditions are such in children as to favor the entrance of germs into the tympanum, and that the mucous membrane of the middle ear is peculiarly favorable to their growth.

The symptoms also differ materially in childhood from those of adult life. In the adult the drum bulges some, is

red and swollen, and the ear canal and the soft parts over the mastoid are usually swollen. In early childhood the bulging of the drum is usually marked, but as a rule there is no thickening or redness, while the surrounding parts are usually not implicated. Spontaneous rupture of the drum is the rule in adults, while in children it is the exception, the short wide tube at this age allowing the exudation to discharge into the naso-pharynx. But even in children the lumen of the tube is sometimes entirely closed by the swollen mucous membrane. Besides the anatomical conditions there are certain physiological factors which have a modifying influence upon middle-ear inflammations in children. The power of resistance of the mucous membrane is reduced, along with a general reduction of the vital forces during illness of the child, and consequently reacts less violently than it would under ordinary conditions when infectious elements come in contact with it.

It is not uncommon for the pus in the middle ear to be thick and tenacious so that drainage through the tube is not possible. It may even remain clogged in the middle ear after the drum has been perforated, allowing a rapid closure of the opening. Post-mortem examinations of such cases have shown pus so tenacious that it was not dislodged by holding it under the running hydrant. Having lately found pus of this character in an adult, who for some days had been in a moribund condition, the possibility has suggested itself that a weakened heart action has much to do with the thick tenacious character of the pus.

In the treatment of children with otitis media we must adhere in a general way to the principles governing the treatment of the disease in adults. Internal medication should naturally be modified according to the age. The local use of heat and cold, although more troublesome to apply in children, acts as beneficially as in later life. In my hands the local use of iodine has been particularly well borne by children, and has been of benefit in the treatment. As in the adult, close attention should be given to the nasal passages during middle-ear inflammations, and obstructions to the free access of air removed if possible. An exploratory

incision into the drum, when in doubt whether the tympanum contains pus, has been practised but is hardly justifiable. However, at the first symptom of the retention of pus paracentesis should be resorted to. When pus is discharging through an opening in the drum, the result of paracentesis or of spontaneous rupture, the opening should be kept from closing as long as acute symptoms are present. The tendency is for them to close rapidly. I have for years, instead of enlarging the opening with a knife, in such cases made use of a caustic,—especially in small children. After cocainizing the edges of the perforation with a 10-20% solution of cocaine and subsequently drying the parts with a cotton probe I place a crystal of chromic acid directly into the opening. The crystal slowly dissolves and diffuses over the mucous membrane. When it has acted sufficiently long the superfluous acid is removed with a cotton probe. The application is perfectly painless and leaves a round, smooth opening which allows thick secretion to escape more readily than an incision and which heals slower than the latter. I have never seen a case in which it failed to close after the flow of pus ceased. However, on several occasions I have observed an unfavorable action on the pus in the tympanum follow the use of chromic acid, by causing a coagulation of the pus and a plugging up of the opening in the membrana tympani. About eight hours later symptoms of retention, such as pain, a sense of fulness, and a thumping noise in the ear, appeared. In every case the plug soon softened and passed and I have yet to see a case where the use of chromic acid has done permanent damage. Consequently I give it the preference over the other methods of preventing closure of the perforation in the drum. In cases of persistent otorrhœa the syringe will have to be resorted to. In view of the fact that the danger of mastoid complication is not great in children and that the anatomical relations are such as to allow discharge of pus through the Eustachian tube, I believe that we are justified in using air pressure through the external ear to force the pus into the naso-pharynx, especially when the pus is tenacious. This treatment should be instituted immediately after paracentesis of the drum.

Inflation from the naso-pharynx may also be practised. The use of gauze tampons in the ear canal, which of late has found some favor in the treatment of otorrhœa, is not, in my judgment, good treatment. I can see no indication for them for they in no way further drainage but, on the contrary, act as a plug and consequently retard the flow of pus. In children I leave the ear canal open, while adults are permitted to wear cotton in the ear, which is to be changed frequently.

The influence exerted upon the general system in cases of otitis media is greater in children than in the grown. They often lose their appetite and have other digestive disturbances which, if the trouble lasts long enough, end in general marasmus and death. Symptoms of some other trouble to which the ear affection may be secondary often mask the symptoms of the middle-ear inflammation entirely; again the middle-ear trouble may run its course without affecting the general condition of the child.

The extent to which the ultimate function of the ear suffers in middle-ear affections differs, but in no case is it possible to foresee the amount of disturbance done to the hearing. Unfortunately I have no record of the temperature in the acute cases, as the children were all treated in the out-door department, where the temperature could not be watched. In the chronic forms the temperature runs very much as it does in the adult—*i. e.*, there is a very slight but irregular elevation of temperature, with an occasional sudden rise and fall. A more pronounced rise or a persistent high range for several days would indicate some serious complication or a new infection. Irregular temperature, with daily elevation of one or two degrees, would look suspicious of tuberculosis.

From what has been said of the frequency of middle-ear inflammations in children and of the absence of symptoms in many instances, we can conceive of the rationale of a daily examination of the ears of all unwell infants, from the beginning of their trouble to the end of convalescence. In the absence of otorrhœa, there is no symptom by which inflammation of the middle ear can be recognized with any degree of certainty, so that the children are often treated

for other infantile diseases when an inspection of the drum might have led to a diagnosis.

Mastoid involvement does not in children necessarily indicate an operation, as the inflammation may subside spontaneously. As evidence of such occurrence I will briefly cite two instructive cases from my practice.

CASE 1.—A child, one year old, had otorrhœa of several weeks' standing, which had started with acute symptoms. From a small perforation in the upper and posterior segment of the drum there was a scanty discharge of a tenacious pus. The perforation showed a marked tendency to close, the surrounding membrane becoming injected and raised as it got smaller. Simultaneously with this narrowing of the perforation in the drum, the soft parts over the mastoid became swollen. Four times this occurred, and subsided immediately upon enlarging the opening in the drum, until it finally, after 2-3 months, closed permanently.

CASE 2.—In a child, fifteen months old, a decided swelling was noted over the mastoid and extending slightly down the neck, after an otorrhœa of several days' duration. The drum was apparently normal and, outside of a rise in temperature (102.2° F.), the general condition of the child was not affected. By the local use of iodine on the mastoid and the application of cold, the swelling subsided and in ten days the part was restored to normal.

In the acute forms of middle-ear disease the mastoid is not often involved sufficiently to cause objective symptoms. The tympanum and mastoid cells are at this period not so well defined as in the adult, and can be looked upon as one large cavity. The trabeculi of bone at this age are in a state of immaturity, and show a tendency to break down in disease of the parts and form one cavity, which fills with pus and granulation tissue. Even where such a cavity has formed and filled with products of inflammation, and notwithstanding a thin cortex of bone, it is often impossible to notice changes over the mastoid. Where such extensive changes have taken place in children, involvement of the facial nerve is particularly common.

The bottom of the external ear canal is nearly always narrowed in children with extensive changes in the middle ear and mastoid, and rarely granulation tissue extends into

it from one of its walls, under which loose pieces of necrosed bone can be felt with the probe. If the mastoid contains much pus it sometimes burrows down the neck.

In the operative treatment of mastoid affections we have to differentiate between two kinds of cases, viz.: those in which the cortex of the mastoid has been broken through, and pus is found under the soft parts, or, possibly, discharges through a spontaneous perforation; and those in which the pus remains limited to the bone. Pus invades the soft parts usually at a point where the infantile mastoid is situated. This is deep, and apparently in the upper part of the neck. It can in fact be compared to an abscess of the neck in adults.

The pus, on the other hand, may leave the mastoid higher up behind the auricle. These are the more common cases, and the pus may burrow up under the soft parts, or the perforation may be situated higher up at the upper edge of the temporal bone, and even destroy a portion of the squama.

The operation for relieving mastoid disease is simplified, where a fistulous opening exists by following on a grooved director to the diseased area. As ossification is incomplete in infants, it is sometimes difficult, in making the mastoid incision, to tell when the knife has entered the mastoid, or how deep it has penetrated. This endangers the deeper and vital parts, especially if surrounded by septic material. I recall a case in which I cut through the comparatively soft mastoid into the dura, with the result that septic meningitis set in, resulting fatally. In the adult there is less danger of such accidents.

The periosteum covering the mastoid is not as readily detached in infants as it is in adult life. It is firmly attached to the bone by connective tissue, so that it is almost impossible to remove it without the aid of some cutting instrument. In infants the attachment of the sterno-cleido-mastoid muscle also spreads over the entire mastoid.

After entering the bone the relation of the parts can best be studied by the aid of a probe introduced in the ear canal. It will be found that the floor of the pus cavity is frequently formed by the bony ear canal; where there is a fistulous

opening in the mastoid, the bridge of bone between it and the ear canal should be removed in order to leave a free opening into the middle ear. If it is not even possible to grasp the bone at this point, the cartilaginous ear canal will, as in cases without a fistula, have to serve as a guide to the opening. After reaching the tympanum, the cartilaginous wall is pushed aside, which exposes the drum and enables the operator to preserve that membrane if in a healthy condition. In removing the cortex of the mastoid and the bony covering of the tympanum, it is best to work back from the posterior edge of the porus acusticus externus. In the selection of the instrument for entering the mastoid in young children, I have given Hartmann's conchotome the preference. The tissue is at that time too fibrous for the chisel or curette to take hold, while with the conchotome the cartilage can easily be entered.

With it I remove all the cartilage which forms the outer wall of the cavities in the mastoid, taking the precaution to cut the tissue in a direction as near parallel with the surface as possible to avoid injuring the deeper parts. The danger of wounding the lateral sinus is greater at this age than in later life, owing to the uncertainty as to its location. I am on this account extremely cautious in removing granulation tissue with a curette in children. Fortunately it is not as essential to cleanse the cavities of this tissue as thoroughly as in the adult, as it more readily exfoliates if there is free drainage. After cleansing the cavity as thoroughly as it is deemed advisable, it is covered by the soft parts. The posterior wall of the membranous ear canal is split horizontally to the concha. It is then pressed into the cavity of the mastoid and held in place by means of a tampon. The wound behind the auricle is closed if in a healthy condition.

By these more thorough operative measures than have been customary with most operators, we are able to bring about a more rapid cure of severe cases of otorrhœa and to preserve more of the function of the ear. Undoubtedly lives are also saved that with other treatment would have been lost.

A CASE OF EPIDEMIC CEREBRO-SPINAL MENINGITIS WITH BILATERAL OTITIS; TREPAN-
NING OF BOTH MASTOIDS, AND EXPOSURE
OF THE TRANSVERSE SINUS; RECOVERY.

BY DR. STANISLAUS v. STEIN, Moscow.

Translated and Abridged from Band xxxii., S. 255, 1895, by Dr. J. A.
SPALDING, Portland, Me.

Kolla, C., æt. five years and eleven months, had whooping-cough beginning in November, 1894, and lasting till March 17, 1895, when the first symptoms of a new disease began with epistaxis and fever. Between that date and the 29th of March he had a temperature varying from 101° to 102.5° , pulse from 110 to 130, delirium, bronchitis, otorrhœa on the right and then on the left side, constipation, loss of hearing, enlargement of the spleen, enlarged pupils, convulsions of the upper and lower extremities, general hyperæsthesia, and incontinence of urine. The otorrhœa stopped for a while in one ear and then returned so that finally, on April 3d, I was consulted to see if there were any connections between the ears and the other symptoms.

I found double otorrhœa, discharge moderate but thick, perforations in lower anterior quadrants of both *Mt*, and slight nasal catarrh. The diagnosis was rendered difficult by the rigidity of the neck. Temperature fell as low as 99.8° . The ophthalmoscope revealed anæmia of the fundus of both eyes, œdema of optic papilla, but no choked disc nor choroidal tubercles. As the temperature had fallen to 99.4° , considering the loss of strength, the possibility of a collection of exudate in the calvarium, and the peculiarity of the symptoms, it was decided to open the mastoids.

The right mastoid was found to contain much stringy mucus and pus, whereupon I opened down on to the transverse sinus with

the result of letting off more stringy exudate. A syringe passed into the sinus failed to find pus or thrombus, whereupon the field of operation was closed.

The left mastoid, antrum, and sinus, were similarly operated, directly after the right, and found in about the same state.

April 7th.—Temp. 100.8° in the morning, and 101° at night. The child tries to reach for the bandages constantly, groans during the change of dressing, closes the eyes better, but the spasm in the neck and condition of the sensorium are as before.

Between the last date and April 11th, the child improved, the tossing of the head was less, the pupils reacted to light and shade, the lips made swallowing movements, but the total loss of consciousness and spasm of the neck muscles still persisted. Incontinence of urine, no vomiting, but the constant attempts to pull away the bandage compelled us to tie the child's arms.

Up to April 19th, there was not much change except slight perspiration at times, epistaxis once, more consciousness, in that the left arm reaches for the left ear and the right arm for the right ear during the change of dressings. Syringing of the aperture evacuated some pus. Temp. 99.4° . On giving him some bitter powder he spits it out, a sign that the sense of taste is returning.

April 23d.—He moves his eyes and fixes objects.

April 27th.—He hears loud tones, holds out his hands, points with his fingers, recognizes his mother for the first time, but cannot repeat any words spoken to him.

By the 2d of May, he could remember things occurring before his illness, but had a bad night with some delirium which, however, lasted but briefly, so that on the next day he was much better again and continued to improve.

From this time on the child's condition constantly improved, the wounds in the mastoid healed completely, the hearing increased to 12 *m* for whisper, and the perception for tones throughout the entire scale seemed normal.

Microscopic examination of the discharge at various dates revealed the diplococcus intracellularis Weichselbaumi.

The probability of this being a case of epidemic cerebro-spinal meningitis is enhanced by the fact that this child's brother, four years old, was attacked with typical symptoms of meningitis on the 16th of April, and died on the 21st. The ears of the latter patient seemed healthy. The

temperature varied from 99.4° to 103° . The parents regretted that this child could not also have been operated upon. Possibly in the future the mortality of such cases, which yield to no other treatment, may be materially reduced by early opening of the cerebral cavity. Perhaps, additionally, bilateral opening of the mastoids in typical cerebrospinal meningitis will act as thoroughly as opening of the abdominal cavity in tuberculosis.

The case here offered is interesting to the neuro-pathologist in the gradual restoration of the function of the various portions of the brain. First we observe return of the sensation of pain, then of the motility of the upper and lower extremities, then of the movements of the lips (as in sucking), mimic motions of the facial muscles and of the eyes, and finally of the taste, hearing, comprehension of words without the capacity to repeat them, and last of all disappearance of the rigidity of the neck.

ON THE THYROID TREATMENT OF CHRONIC DEAFNESS.

BY DR. ALFRED BRUCK, BERLIN.

Translated and Abridged from Band xxxii., S. 72, 1893, by Dr. J. A.
SPALDING, Portland, Me.

MANY attempts have been made to extend the thyroid treatment of other diseases to certain forms of deafness included under the vague term of dry chronic middle-ear catarrh, or the still more vague one of middle-ear sclerosis.

Scarcely any other disease of mankind has remained so obscure as the so-called sclerosis of the middle ear, and although the pathogeny of some types has been somewhat elucidated (anchoylosis of the plate of the stapes: Politzer), yet we have mostly gone no farther than mere hypotheses.

Nor have we been more successful so far as the treatment is concerned, for in lack of a cure there has always been a constant search for new methods and new remedies, so much so that we must still feel skeptical of doing the patient any good, nor can we congratulate ourselves on having found a final cure.

Most of the usual tests for hearing are still imperfect. Vulpius,¹ for instance, says that none are of unconditional value for diagnosis (I would like to add for prognosis also) of the various types of ear disease beginning with progressive loss of hearing. Especially unfavorable is the outlook in the adhesive or sclerotic processes.

¹ Vulpius, "Ueber Behandlungsmethoden bei adhäsiven Mittelohrprocessen," *A. f. Ohrenheilkde.*, Band xlv., Heft 1, 1896.

Vulpus has lately recommended the thyroid treatment in adhesive affections of the middle ear. He expresses himself hopefully, and looks for favorable results in the treatment of cases which hitherto have been thankless. He was led to employ this method because he had read in the clinical reports of deaf myxœdematous patients treated with thyroids, that the hearing had improved during the constitutional treatment and without any local application. Ewald¹ thinks that about one half of his cases of myxœdema are deaf from "chronic catarrh of the membrana tympani," whilst Vulpus attributes the deafness to chronic hyperplastic catarrh of the middle ear.

Basing his theory on these cases reported by Ewald, Vulpus employed thyroids in every case of deafness and obtained, especially in younger people, surprising and promising results in those cases characterized with opacity, thickening, rigidity, or induration of the *Mt*, and diminished mobility of the ossicles. He claims to have obtained in cases that had resisted every other means of treatment astonishing improvement of the hearing. The thyroid treatment was repeated from time to time to preserve the hearing. He gave one dose daily of 0.30 gram of Merck's or Leichtenstern's tablets, to children half that dose, and carried it on for four weeks with occasional rest for a day or two. If no improvement ensued in ten days he suspended the tablets entirely.

Vulpus refers the benefit to rapid and energetic resorption of œdematous fatty tissues, and says: "Since the hyperplasia of connective tissue with consecutive shrivelling and eventual calcification or ossification is in most cases of adhesive middle-ear disease introduced with the formation of easily absorbable proliferation tissue, we may take it for granted that in the latter the effect of the thyroids begins." (Such a view would also explain why in the initial stages the remedy acts to the greatest advantage, and, conversely, why it is less efficacious the more the neoplastic tissue has consolidated and become less amenable to absorption.

¹ Ewald, *Die Erkrankungen der Schilddruese, Myxoedem*, etc., Wien, 1896, p. 157.

I need not go farther into theories, but will suggest that the diagnosis of such thickening and adhesion is difficult, and that consequently the proper indications for the thyroid treatment are difficult to establish.

Incited by Vulpus's paper, further investigations were begun at Politzer's clinique by Brühl, and at Gruber's by Alt. Brühl treated 21 very deaf patients, aged between twenty and forty, with the thyroid tablets and nothing else. He¹ found, out of 16 who were treated a long time, 8 with not the slightest improvement in hearing, 2 left improved before the permanency was assured, 4 showed a satisfactory improvement after several weeks, and 2 were greatly improved, 1 showing an increase for the voice from $\frac{1}{2}$ M to 7 M. Brühl gave one tablet of 0.30 gram daily for a week, and in the second week two or even three daily. After four weeks he stopped, and in three days began again as at first. Neither he nor Vulpus observed thyroidismus. Brühl's views are not so highly colored as those of Vulpus. He attributes the benefit to the iodine in the thyroids or to some functional connection of the thyroid gland with the ears, and he urges the new method in those cases in which we are well assured that the alterations are susceptible of absorption.

Alt² obtained very good results in patients for whom all other methods had been of no avail. He thinks well of the thyroids, and recommends them also in the residua of chronic suppuration, with cicatricial alterations in the mucosa of the tympanum, rigidity of the ossicles, fixation of the stapes plate, and obliteration of the round window.

Politzer thinks that we should not be too sanguine about the thyroid treatment, but postpone a definite judgment until time has shown its real value.

Although one has a right to be distrustful of any help to be obtained by new methods in chronic deafness, yet the few favorable results so far published led me to try it with much perseverance, for I can now refer to forty patients with

¹ Brühl, "Ueber Thyroidbehandlung bei adhäsiven Mittelohrprocessen," *Monatsschr. f. Ohrenhkl.*, 1897, No. 1.

² Alt, *Monatssch. f. Ohrenhklde.*, 1896, Band xii.

whom I have followed Vulpus's suggestions with but few modifications. The number would have been larger had I not selected my cases carefully, all between eighteen and forty-eight years, and all of whom had been treated by well-known methods,—pressure-probe, injections of chloral hydrate, and sodium bicarbonate into the middle ear, to say nothing of air-bag and catheter,—but all in vain. Then the thyroid tablets of Wellcome and Burroughs, as well as those of Merck, were used. In two cases both kinds were employed, one after the other. The dose was at first 0.10 gram, three times daily, occasionally two tablets each of 0.10, twice daily. One patient took three tablets of 0.10 in one day, but soon exhibited well-known symptoms of thyroidism, with palpitation of heart, sense of fear, faintness, and lassitude. In two other patients one dose of 0.30 produced the same manifestations. Finally, in one patient, a nervous, sensitive, and corpulent woman, thyroidism was so marked that nothing could be done after one or two doses.

These instances prove that the treatment is not so free from danger as Vulpus would have us believe, although even in face of the occasional thyroidism, one might reasonably persist with it, were any reasonable degree of success to be expected. But such in my opinion is not to be expected, contrary as it may be to that expressed by others, and so little encouraging as to prevent others from proceeding with their experiments. Personally I must say that from the employment of thyroids, no matter for how long a time, I have not yet seen a single case of positive improvement in the hearing.

Among my cases were some of adhesive processes, some with slight ankylosis of the ossicles, and some with the residua of middle-ear suppuration. I believe the slight improvement in hearing occasionally noted depends on erroneous observations. Slight variations in hearing, unless permanent, prove nothing at all. They may depend on changes in the atmosphere, on the intensity of the subjective sensations of sound, and on the attention and intelligence of the patient. It is suggestive in this respect that the slight improvement noted was observed only in the

intelligent, the better mental development leading probably to self-deception. Thus, in testing with the voice, we habitually use certain numbers and words, for the sake of simplicity, and this very simplicity leads to guesswork, and so the patients think that they hear better than before. But if then we use words that they have not heard before, the improvement is shown to be due to self-deception.

Errors of this sort may be avoided by following Jacobson's suggestion, and using two numbers or words directly after the other as 32 or 68, or Friedrich and Bismarck. Then we note the distance at which the first word was correctly repeated by the patient. Now if at a later test the same word is heard farther than before, we put that distance aside, and test with the second word, when if the distance is equal to what it was at first for the first word we grant as good hearing as before and test again for some improvement. When the percentage of gain is great, all doubt is excluded as a matter of course, although repeated tests may be undertaken for verification. When the increase is slight it is more likely to be due to sources of error. For all these reasons we should often test with the watch, in addition to the voice, and with Politzer's audiometer, or, better still, with a stop-watch, so as to test when the watch stops or goes ahead.

After this digression let me return to my theme, and say again that, in spite of the fact that all possible sources of error were excluded, I failed to obtain any results which could influence my unfavorable opinion regarding the thyroid treatment in chronic deafness. My material may not have been large enough, and there may have been too many patients with alterations beyond absorption. But it is, after all, curious enough that, in a list of cases larger than those of Brühl or Alt, I failed to find even one instance of well-marked improvement in hearing. Therefore, I close by saying *that, according to my experience, the treatment by thyroid extract of chronic deafness, no matter how it originated, is useless in every case in which all other methods have equally failed.*

SUPPLEMENT.—After finishing a proof-correction of my

former paper, I saw one by Eitelberg,¹ reporting his results by this method. In 8 cases observed for a sufficient length of time, he saw improvement in 3, one of these being a man over fifty, though not until some time after treatment had ceased. The tinnitus in these three cases was also improved. Eitelberg does not expect a great deal from the new method, but urges further investigations. It should be noticed that Eitelberg kept on with the old methods (catheter, etc.) whilst employing the thyroids. I think that in order to obtain an impartial opinion of the value of the new method it must be employed alone. But, as some cases of *later improvement* have been here shown, I intend, for the lack of anything better, to go farther along with my thyroid investigations, though I must confess not with great hope.

NOTE BY TRANSLATOR.—From my small experience with the thyroid treatment, I should be inclined to recommend it in the *early stages* of those cases which are likely to eventuate in the so-called chronic catarrh of the middle ear. Especially have I found it of some value in cases with one ear affected considerably and the other but little. It seems to act as a preventive. I may add *passim* that the *supra-renal extract*, so much extolled as a local astringent for nose, ear, throat, and eye diseases, is improving some cases of tinnitus at present under my care.

¹ "Zur Behandlung der Mittelohrsclerose mit Thyroidintabletten," *Arch. f. Ohrenhkd.*, 1897, Band xlvii., Heft 1.

TINNITUS AURIUM.

BY DR. RUDOLF PANSE, DRESDEN.

Abridged Translation by Dr. JULIUS WOLFF, New York.

(From vol. xxxiii., *Germ. Ed.*, p. 244, 1896.)

THE following reflections upon tinnitus aurium are intended to serve as a supplement to my publication concerning *Hardness of Hearing Caused by Rigidity of the Tympanic Fenestræ*,¹ and also as a basis for further investigations of the subject.

I have examined the cases that have come under my observation in a uniform way and have extensively searched the literature on the subject.

NOISES IN THE EARS OF HEALTHY PERSONS.

Hensen in his treatise upon the *Physiology of Hearing* distinguishes two groups of noises:

1. Low, dull ones, which preferably arise in the middle ear, like the resonance sound C (according to Helmholtz) of the ear drum after closure of the ear, or the muscle sound of yawning, or the vascular sounds heard during absolute quiet.

2. High, ringing ones, which arise from conduction into the labyrinth through the stapes, the fenestra rotunda, or the labyrinth watch.

Preyer and Brunner say: (1) the muscle sound does not go above $A^{11} = 27$ vibrations; (2) it is fluttering and less uniform than the one arising from the blood-current.

¹ Gustav Fischer, Jena.

According to Schwartz the noise caused by pressing the jaws together must be interpreted as a muscle sound.

Lucae noticed after arduous work, especially at night, that he heard a high, faint ringing (f'') on the left side, and attributes it to the positive labyrinth pressure.

In agreement with Lucae, Schwartz writes: Noises in the ears of healthy persons may follow disturbances in circulation, violent emotions, mental over exertion, and long continued, monotonous impressions of sound. Furthermore, continuous noises may occur during a lifetime in persons of normal hearing, due probably to anomalies in the course of vessels.

Hyrthl describes rare cases in which the stylo-mastoid artery runs between the branches of the stapes, whereby noises can also be caused.

I myself have on two occasions been able to test with tuning-forks ringing noises in my ears, arising without provocation, and found once c' , once g^3 .

According to Gottstein, Lucae was the first to emphasize the fact that during strong contraction of any group of facial muscles, especially of the orbicularis palpebrarum, the stapedius may also be stimulated to contraction, which is manifested, subjectively by a sensation of hearing, objectively by an outward movement of the ear drum.

Hitzig, and after him Bernhard and Berger, found that in cases of facial paralysis the attempt to contract the completely paralyzed muscles causes a low buzzing in the ear through the contraction of the stapedius. Samuel Sexton mentions, besides the well-known causes, friction of the joint-surfaces of the ossicles.

Kiesselbach states that entotic ringing occurs in a normal ear from galvanic stimulation of the auditory nerve; also at the end of the act of yawning in normal ears as well as those affected with catarrhal deafness. The latter he considers to be a result of an irritation of the end apparatus of the auditory nerve by a contraction of the tensor tympani. Kiesselbach thinks that the sound accompanying ringing in the ears or irritation with the galvanic current originates from the sounds of the blood-current, which normally we do

not hear, as we have become accustomed to the constant stimulus. They reach our consciousness, however, as soon as the objective noise becomes stronger or changed in some way, or when the irritability of the auditory nerve is increased. The sounds themselves come from the resonance spaces of the middle ear.

Even if there is a considerable discrepancy in the opinions of other authors concerning the mode of origin, the well-established facts seem to be in harmony with Hensen's conception, "Low notes are produced in the middle ear, high ones principally in the inner ear."

PATHOLOGICAL NOISES IN THE EARS, IN GENERAL AND CLASSIFIED.

The earlier writers distinguish among the noises in the ears, *susurrus*, *sibilus*, *bombus*, *tinnitus*.

Itard distinguishes between true and false noises in the ears. The former arise from actually existing sounds; the latter follow explosions or long-continued noises, or accompany hypochondriasis, hysteria, cachexia, wakefulness at night, etc., and may lead to hallucinations. Itard believes that with compression of both carotids the buzzing generally ceases. As an historical example he states, J. J. Rousseau for thirty years had arterial hammering in his ears.

v. Gaal believes that venous noises are buzzing in quality, those of arterial congestion more ringing.

Wilde compares *tinnitus* with the *mouches volantes* in the eyes. As one of the causes of the noises he designates the "non-vibratility" of the ear drum.

Kramer assumes the seat of noises without hardness of hearing to be in the *chorda tympani*, and treats them with *strychnine per tubam*.

Politzer describes noises due to (1) plugs of cerumen or abnormal pressure upon the ear drum or its adnexa; (2) furuncles occluding the meatus, coincident hyperæmia in the tympanum and labyrinth, reflex irritation of the auditory nerve; (3) eczema, and also swelling of the mucous membrane of the tube and tympanum.

According to Politzer, noises are present in more than two thirds of all cases of disease of the middle ear, much more rarely, however, in purulent catarrh with perforation than in simple catarrh without perforation. The causes are: increased intra-auricular pressure, hyperæmia of the mucous membrane and secondary changes in the labyrinth, permanent hyperæmia, widening of blood-vessels, chronic exudation, formation of calcareous salts and pigment.

Politzer mentions as causes for noises in the labyrinth: hemorrhages, contusion of the nerve-endings, calcareous deposits, varicose dilatation of the vessels in the nerve trunk, colloid degeneration of the auditory nerve, new growths in the cochlea and auditory nerve.

Tröltsch distinguishes between two kinds of subjective auditory sensations:

(1) those due to irritative conditions of the auditory nerve in chronic, especially mechanical, hyperæmia of the contents of the skull, in intoxications, quinine, salicylates, alcohol, in anæmia, chlorosis, valvular lesions, nervousness.

(2) real ones, arising in the head, usually of vascular origin, constant in acute inflammations of the tympanic membrane and cavity and increased pressure in labyrinth. He emphasizes that "All noises actually arising in or near the ear must necessarily act more strongly on the auditory nerve, if the natural outward sound conduction from the organ of hearing is in any way diminished."

Buzzing in the ears without impairment of hearing, "which may occur with any severe cold in the head," is attributed by Tröltsch to hyperæmia of the tubes.

The blood-vessel sounds arise (according to Nolet-Leyden) from eddies in the current, especially at points where the blood flows from a narrower into a wider portion of the tube: as, for example, from the sinus into the jugular vein.

Blood-vessel sounds which are pulsating and hammering in quality come from the internal carotid or the small arteries in and near the temporal bone.

The blood-sound is heard: (*a*) by increasing the resonance of the ear through closure of the air-column in the outer or middle ear, or the accumulation of fluid there;

(*b*) intensification of the blood-sounds through increased cardiac activity or local disturbances in circulation; (*c*) hyperæsthesia of the auditory nerve or the nervous central organs.

George P. Field¹: The pressure in the labyrinth is increased in Bright's disease, arthritic hemicrania, in cardiac affections, after quinine, salicylates, amyl nitrite, blood-letting. It is decreased in anæmia, especially when acute, and in chlorosis. Both increase and diminution of pressure may cause buzzing in the ears.

Ladreit de Lacharrière divides the noises into: (1) those which are characteristic of occlusion of the air-passages, the external meatus, and the tube; (2) those due to pressure on the labyrinth through the middle-ear organs; (3) those of labyrinthine origin from diseases of the inner ear; (4) those in the neighboring parts of the ear—pseudo-subjective noises.

Lennox-Browne believes that bilateral tinnitus signifies a constitutional, the unilateral a local, cause.

Douglas Hamming adopts: (1) occasional noises from tobacco smoking, chronic aural catarrh with inadequate contraction of the inner muscles; (2) buzzing ones from cerumen and foreign bodies in the outer ear; (3) bubbling ones from fluid in the tympanum; (4) continuous rustling from venous congestion of the labyrinth; (5) pulsating noises (*a*) from causes outside of the ear (aneurisms, anæmia), (*b*) from arterial engorgement of the labyrinth.

Hartmann distinguishes: (1) ringing (seething, singing, chirping), not infrequently occurring spontaneously, characterized by a constant note (after Hagen, *a*²); (2) buzzing (rushing, rumbling), with a lower quality. Some cases are nervous, accompanying brain tumors, labyrinth affections, with or without middle-ear trouble. A large part arises from the blood-current or muscular activity. Most frequently these noises are heard under conditions favorable to resonance in the ear, cerumen, polypi, secretions. Also in intensified sounds and hyperæsthesia of the auditory nerve. Hearing of melodies, human voices, etc., he attributes to cortical irritation.

¹ *Medical Times and Gazette*, 1878, June 8th.

Politzer alleges that unilateral noises sometimes are not noticeable until the better-hearing, or normal ear, is closed.

As regards the *frequency of occurrence*, tinnitus was found by Kramer in 70 per cent.; Eitelberg in 61 per cent.; Turnbull in 52 per cent. of all ear cases.

Politzer assumes subjective noises in two thirds of all ear patients, and considers the continuous ones the more unfavorable.

Concerning the varied course, Politzer writes: (1) first tinnitus, after months or years of difficulty in hearing; (2) more rarely the reverse; (3) both together, *e. g.*, in acutely beginning tympanic affections; (4) tinnitus and hardness of hearing increase uniformly; (5) just as frequently, the harder of hearing the less the tinnitus, which ceases with deafness; (6) rarely the noises increase even after deafness.

In regard to *prognosis* Kayser arrives at the general conclusion that continuous, double-sided, high-pitched noises, extending into the head, give an unfavorable prognosis, both in respect to the chance for cure and to the future serviceability of the organ of hearing.

Treatment.

Wilde and Gruber prescribe tincture of arnica, fifteen drops three times daily, increasing to thirty drops. Disadvantageous where there is congestion (Schwartz). Tepid baths, 25°-27° C., act sedatively where there is general nervous erethismus. The efficacy of muriate of ammonia in nervous tinnitus is corroborated by Kirk Dunkanson.

James Hinton, Hagen, found strychnine to have no effect.

Woakes and Hamming: hydrobromic acid three times daily, fifteen to twenty drops in sugar water.

Politzer employs the air-douche for noises accompanying middle-ear affections. Internally narcotics. During the increase, vesicants over mastoid; in syphilis, potassium iodide. According to Politzer-Türk, pressure on the mastoid diminishes the noises. Weil quieted noises with blowing at the ear, others he increased thereby, and still others were unaffected. The effect, he believes, is due to a sympathetic reflex, as, at the same time, the pupils dilate.

Since almost all former classifications of tinnitus aurium are based upon varying or contradictory assumptions as regards their origin, it became a matter of interest to me to discover, if possible, by means of most minute and uniform examinations of patients, some differential points based on the seat and cause of the noises. I have examined all patients suffering from noises in the ears from the following points of view. I noted down the age and sex of the patients, then the appearance of the tympanic membrane before and after inflation; furthermore, whether the tube was or was not patent, the tympanic cavity free from pathological contents. For the more exact consideration of the noise, I first noted the side affected, or its bilateral nature, whether it was uniform or pulsating in character, whether projected into the ear or outwards, whether notes or definite noises were heard. To determine approximately the pitch of the rumbling, hammering, blowing, or whistling sound also seemed to me to be of value. Furthermore, I inquired into the intensifying or allaying effects of exercise, use of alcohol, etc. Whether closure of the meatus strengthened or weakened the noise, whether it was perceptible to the examiner, whether inflation caused it to cease, finally, whether occlusion of the vessels in the neck had this effect, —all these were points for investigation. The examination was concluded by an accurate test of the acuity of hearing.

The most practical subdivision seems to me to be, just as with all other diseases of the ear, that based on the origin in the various parts of the organ of hearing, the outer, middle, inner ear, and the brain portion of the auditory nerve.

There remains, to be sure, a group of noises without interference with hearing, whose point of origin we often cannot even surmise, but which allow us to suspect their dependence upon the circulatory system. I shall discuss these separately.

Conduction-Sounds.

Since Bezold's important publications, we are in most cases of impairment of hearing able to locate the trouble by the functional examination. Just as sounds which in the open air, or even in a partially closed space, disappear

altogether may become audible or louder in an enclosed space, so noises which have been constantly present may become noticeable only when the external meatus is closed up or the chain of ossicles becomes rigid. We have here conditions similar to those present in the tests of Weber, Rinné, and Schwabach. Through some obstacle or other in the outward conduction of sound, the perception of sounds transmitted by the bones (and such are usually the ones present in the skull) is intensified.

The lower notes which require the conducting chain to transmit them to the inner ear are, when transmitted through bone, much more intensified by interference with the action of this chain than are the high notes, for the perception of which sound conduction by means of the ossicles is not necessary. From my investigations I am inclined to believe that of the noises originating in the head, only those up to c' are intensified through impeded outward sound conduction.

As types of pure interference with sound conduction, we may, according to Bezold, look upon the sequelæ of middle-ear suppuration. But, as is well known, these very cases so rarely are complicated by noises in the ears that I have not seen a single instance. I must, therefore, take the cases of chronic catarrh and typical sclerosis as my pure cases.

Among my eleven cases of this kind, only one, which for certain reasons was superficially examined and whose hearing was not improved by catheterization, had a sound in the third octave, all others ranging from c (128) to c' (256), rarely C (64 vibrations).

As impure cases of impediment to sound conduction I have adopted those of acute middle-ear suppuration, as I assume that in them there is at the same time not infrequently participation of the inner ear in the process. In three of them I found noises with the pitch c^6 , c^5 , and c^3 .

In like manner cases of occluding cerumen or otitis externa, often strangely accompanied by loss of hearing for high notes, must remind us of "reflex" high notes; one case with sound c^6 besides c^3 .

A positive proof of the statement that sounds of the c

(128) octave are caused by hindrance in sound conduction is given by the beneficial effect of inflation with air. If, after the same, the noise disappears for a time, an obstacle to sound conduction, now removed, was the cause of the noise. It seemed to me, however, from my observations that even labyrinth noises may disappear after inflation for a very short time, a few seconds—of which more will be said below.

Among 6 acute cases in which inflation was performed the tinnitus disappeared in 1 and improved in 3. In the 1st case the buzzing of about 128 vibrations disappeared, but the beating remained as evidence of the arterial hyperæmia. The 3 improvements included 2 sounds of about 64 vibrations and 1 corresponding to about c^2 ; on the other hand, 2 noises that were unimproved corresponded to c^5 . In 14 cases of chronic catarrh 11 showed an effect after inflation. In 8 of these, all of which were between 64 and 256 vibrations, the noises ceased after inflation, in 3 it remained; of the latter 2 were pulsating in character.

A very interesting statement was made by one patient, who said that the note 128 remained away for a considerable time, while the note between c^3 and c^4 very soon became audible again. In one case, after several weeks of treatment, the low note disappeared, and a note, c^5 , which hitherto had rarely been heard, now appeared and did not disappear until after protracted administration of iron.

If we assume that impeded sound conduction is the cause of the noise, then the latter must be intensified if the impediment is increased. But not in all cases. For, in the first place, just that particular degree of tension in the conducting apparatus may be most favorable to the consonance of the blood-sound which has been established by the pathological process; in the second place, we often cannot by simply pressing the ear canal shut produce greater tension in the chain—for instance, in case of a rigid drum and hammer; in the third place, too great an increase of pressure might firmly fix both fenestræ and thus suppress all sensation of sound.

Intensification took place in a case of otitis media (note c 128), an acute catarrh of tube (g^3), in 3 chronic catarrhs

(128-256), and 3 scleroses (16, 128, c³), in 3 cases with normal hearing (c⁵ and c²), 1 aneurism (?), and 1 case of nervousness. Strong pressure diminished the noises in 8 cases (g³, 3 times c 128, twice c 64, and once C 32), intensified in 4 cases (128-256), and caused a roaring sound in 1 case where only a high note, c⁵, existed before.

These tests also show that the low notes up to 256 are chiefly the ones of middle-ear origin and due to defects in conduction, but the results are less certain than comparisons with the functional examination and inflation.

The other questions relating to the nature of the conduction-noises may be treated more briefly. Seventeen times it was completely or mainly unilateral; 4 times bilateral or changing from side to side. Uniform noises were present in 15 of these 20 cases, pulsating ones 4 times, and once an occasionally pulsating noise. The pure conduction-noise may, therefore, as a rule, be considered a venous sound.

Rest in bed caused increased perception of the noises in 3 acute cases (c 128), 1 with g³, in 9 chronic cases (3 times 128, 3 times 64, once 64 with occasional c⁴, once 32 with occasional c⁶), sometimes enough to prevent sleep. Inasmuch as all inner noises can be drowned by loud surroundings I do not believe that investigations in this direction would give us any clue as to the origin of the noises.

Alcohol and exertion increased the tinnitus (64 to 256 vibrations) in six cases. Certain melodies were heard by only one woman with a nervous as well as syphilitic taint. After all other remedies had been exhausted I tried in vain to remove the stapes. Even if all of the sound-conducting apparatus with the exception of the plate of the stapes has been removed, I still do not think it impossible that the source of her noise (c²) is located in the fenestræ. The assumption of Wilde, Urbantschitsch, Hartmann, Brunner, Kayser, that when whole melodies are heard, the seat of the lesion is central, is indeed very plausible, but in tainted subjects entirely extraneous causes may be interpreted as being of a higher order and may produce actual illusions, as is shown by the investigations of Köppe-Schwartz.

Schwartz, for instance, treated a woman with an hereditary

psychical taint locally for tinnitus with success. With this the hallucinations also vanished, and she was saved from a threatened outbreak of insanity.

Most patients projected the noises so well known to them inwards, but I know from my own experience that even after a long duration passing deceptions may occur if very similar noises arise outside.

The comparisons usually made in cases of defective conduction are with the roaring of trains, waterfalls, hydrants, ocean, etc. When the pitch of the sounds has not been examined, and the above comparisons are made, we may assume the sounds to have from 16 to 256 vibrations.

The examiner could never perceive the conduction-noises.

Reflex Sounds.

The link between tinnitus accompanying middle-ear affections and that of labyrinth troubles are those noises which I, following former authors, shall designate as reflex sounds or noises. The reflex may act either upon the nerves of the internal muscles, those of the vessels, or upon the auditory nerve directly. The nature of the noise will vary accordingly.

If the chain of ossicles is fixed by reflex spasm of the muscles, conduction-sounds of low pitch will arise; if arterial hyperæmia is produced, pulsating sounds will arise; if the auditory nerve is stimulated, those high notes, to be discussed later, will be caused which have their origin in the inner ear and the nerve.

The whole group of reflex sounds, therefore, is characterized by the fact that they are not accompanied by impaired hearing, whereas tinnitus of middle-ear or nerve origin will sooner or later show some impairment of hearing.

According to Brunner reflex ringing occurs with closing of the eye, shaking of the head, stroking or pressing upon both tragi (Zaufal).

Schwartz mentions reflex tinnitus through the trigeminal in toothache, especially of the posterior molars.

Reflex tinnitus was noticed by Tröltsch in combination

with blepharospasm due to a cramp in the orbicularis and stapedius which are supplied by the facial. A similar case in an hysterical subject is described by Wreden. Jacobson describes an objectively noticeable spasm of the tensor tympani when the eyes were firmly closed. The same author thinks tinnitus may occur as a reflex from the stomach during severe hunger or dyspepsia.

Schwartz observed a case of typhoid in which the buzzing was cured with purgatives, and once tinnitus accompanying a cardiac lesion.

Gottstein observed a patient with attacks of blepharospasm which were regularly preceded by noises in both ears. These ceased as soon as pressure was made with the finger upon a certain point on the mastoid process.

The pitch of reflex sounds is varied. After the tests of the noises in pure diseases of sound conduction on the one hand and pure nervous affections on the other, I am inclined to attribute here also a muscular origin to the low notes and an origin from the inner ear to the high ones.

Tinnitus Due to Affections of the Inner Ear and the Nerve.

In 1853 Heinrich With divided the subjective noises into reflex sounds and such as are produced by changes in the substance of the auditory nerve itself. The causes for the latter he finds in chemical changes in the composition of the blood, *e. g.*, in typhoid, cholera, chlorosis, etc., and in physical pressure from overdistended vessels, extravasations, or other pathological products.

Moos thinks of the possibility of mechanical irritation of the nerve by calcareous deposits.

Brunner considers the noises in the ear, just like light-perception from pressure on the eyeball, to be mechanically produced, and not to represent an irritation of the end organs of the auditory nerve in the labyrinth. With electrical stimulation, Brenner found c' and g' , Brunner, c' , Hagen, a' .

Zaufal observed a piano-tuner who distinctly heard the note c' when pressure was made upon the tragus.

Benedict says "that all factors that favor atrophy of the

auditory nerve also produce the most favorable conditions to make tinnitus possible."

Theobald believes that the auditory nerve is just as little sensitive to sound as the optic nerve is to light.

Gradenigo considers it to be a fact that "the sound-perceiving apparatus reacts to mechanical, acoustic, electric, or vascular stimuli with a very sharp note, whose pitch is almost constant with each individual (tinnitus aurium c' , c''). There exists, therefore, a group of auditory cells which are particularly susceptible to these stimuli. The nerve- and labyrinth-sounds may be absent in pathological processes that have less an inflammatory than a degenerative character, and also in rapidly progressing processes which have not been preceded by a marked stage of irritation."

Haug observed in typhoid and mumps with labyrinth complications intense buzzing, rumbling, and ringing. In tabes, especially when complicated with amblyopia, the ear affection usually begins with tinnitus, which often disappears as deafness increases. Syphilis shows itself in the ear sometimes by nothing but noises of various kinds.

Kayser describes a case of CO poisoning with severe noises and deafness.

Kirchner noticed in animals which for several days had been given quinine and salicylates (1-3 gr.) marked hyperæmia and hemorrhages of the tympanic mucous membrane, and also in the labyrinth, cochlea, semicircular canals, and pia and dura mater.

Malaria with intermittent noises in the ear was observed by Haug and Urbantschitsch. Almost all authors consider the continuous noises to be more unfavorable than the intermittent ones.

After this review of the statements in literature, let us look at the various cases.

Into the second larger group I have put the 8 cases of "mixed" dysacusis. Among them we find in five buzzing of 64-128 vibrations, and in three higher notes, c'' - c' .

One of my cases I consider to be pure hyperæsthesia acoustica for its own blood-sounds. The note was between 128-256, disappeared shortly after catheterization, without

pressure upon the cervical vessels, became louder after mental work and gentle closing of the ear. Hearing was almost normal.

I was able to gather only three cases of tinnitus with pure nerve affection. Two of them had notes c^4 and c^5 ; one had 258 on the deaf ear, which sound was probably transmitted from the tolerably healthy one. Pressure upon the meatus was without influence. Inflation can have only a transient effect upon the inner ear, which seems to consist in a sort of pressure paralysis of the labyrinth. The tinnitus in my cases was twice uniform, once also pulsating, was always projected into the ear. Melodies were never heard. Twice it was designated as buzzing and roaring, twice it was increased with exertion, once it was increased during rest in bed, and once quieted by it; in two cases the catheter produced slight effect, once for a few seconds, and once (note 256) for a few minutes.

A considerable number of additions to these few cases in otological literature I found.

Toynbee describes several cases of tinnitus which are ascribed to injuries of the inner ear. 1. Blow upon right ear. Thereafter permanent ringing. Membrane and hearing normal. 2. Fall from horse; hemorrhage from ear; constant singing noise. 3. Fall from wagon. Noise of a teapot in the deafened right ear. Slow improvement. 4. After coughing, loud singing noise. 5. After pistol-shot, hissing sound. 6. Cannon-shot close to ear, singing and whizzing sound. 7. After loud shouting by a fishmonger, ringing and rustling in left ear. 8. After explosion of gas, loss of hearing and singing in ear. 9. During skating in very cold weather, sudden singing sound.

Turnbull: Cannon-shot close above the head; unconsciousness, dizziness, headache. Nausea and vomiting for three days. Left ear totally deaf without noises; right side, impairment of hearing, ringing, and rustling.

Tröltsch mentions the finding of hyperæmia, ecchymoses, and infiltrations in the labyrinth, and bases the noises upon these causes.

Lucae: 1. Deafness following hemorrhage into labyrinth,

preceded for three days by ringing. 2. After gun-shot, ringing for five minutes. Then defective hearing, with buzzing and weakened perception of high tuning-fork sounds.

Burkhardt-Merian: After locomotive whistle, continuous high whistling and deafness on both sides for notes above c' .

Kiesselbach: 1. After blow on ear, ringing of pitch f' . 2. After loud blast from trumpet, high whistling, diminished hearing, sensitiveness to noises, dulling of high notes.

Moos: After severe coryza, high ringing on right side whenever a dinner-bell or continuous whistling was heard. Low notes were perceived one third note higher.

Wolf describes the following cases of labyrinth disease with noises: 1. Age forty, shot fired in closed room; steady singing of pitch c^2 . 2. Age twenty-three, after consumption of wine, buzzing in the middle scale. 3. Age twenty-eight, after sneezing, sudden roaring like a waterfall. 4. Age five, meningeal symptoms; hears notes of an organ, voices, whistling on both sides; dizziness. 5. Age fourteen, cerebro-spinal meningitis; seething of water, hissing, poor perception of high notes, dizziness. 6. Age thirty-five, severe injury of mastoid process; hears roaring, rumbling; dizziness. 7. Age forty-two, blood-poisoning; first low hissing, then high rustling. 8. Age forty-two, blood-poisoning; dizziness, thumping, sounds of organ. 9. Age forty-seven, syphilis; mercury treatment; pulse-sounds and intense metallic ringing; low notes retained, high ones lost. 10. Age twenty-seven, after puerperium, low sounds heard; gentle hissing. 11. Age fifty-seven, diabetes; some buzzing, gradual disturbance of hearing. 12. Age forty-one, glaucoma; loud hissing, no impairment of hearing. 13. Age eighty-two, glaucoma; buzzing, diminished hearing.

Brunner: 1. Chemist hears after each explosion of gas a high, clear, protracted, and very annoying sound. 2. Basal fracture; roaring and other sounds, deafness. 3. Blow with stick upon ear; continuous ringing. Tympanum normal.

From these observations it becomes evident that in injuries

of the labyrinth preferably notes of the higher registers arise, for the nerve fibres corresponding to the lower tones are the most remote from the fenestræ and have a protected position in the interior of the nerve trunk. We are but rarely able to differentiate between solitary affection of the nerve and labyrinth. The symptoms of a brain tumor or participation of neighboring nerves may then aid in diagnosis.

Tinnitus in Consequence of Disease of the Auditory Nerve.

Some patients of Wilde who first sought advice on account of noises in the head and singing, having good hearing and no other aural affection, later became afflicted with senile paralysis, "which probably came from softening of the brain." Others with tinnitus without objective lesion died of apoplexy or paralysis. Trölsch had the same experience.

Politzer: In cerebral affections noises are very frequent, *e.g.*, in hyperæmia, softening, and tumors. Very loud noises without objective lesions in the ear and with deafness are suggestive of central trouble.

Kayser believes that in diseases of the central nervous tracts (pons, posterior corpora quadrigemina, etc.) indefinite noises arise, while in cortical disease of the temporal lobe more or less clear sound-pictures, melodies, and the like, are heard. But I have already mentioned above that hearing of melodies may also appear in permanently peripheral diseases.

Brunner considers connected melodies to be a central symptom; once he observed them after large doses of quinine.

Schalle describes a case of apoplexy of the auditory and facial nerves without noises, but complete deafness.

Moos and Bürkner explain the absence of all auditory sensations in sarcoma of the nerve by the complete interruption of all centripetal impulses.

Siebenmann found among 58 tumors of the region of the corpora quadrigemina, impairment of hearing 11 times,

noises only twice, and these only at the beginning of the trouble.

Ludwig Linsmayer: Patient sixty-five years of age, with old sclerosis; sudden cardiac oppression and tremendous noise in both ears, with sensible and senseless words, which soon changed to hallucinations. General arteriosclerosis. Unsuccessful ligation of right carotid followed by complete hemiplegia. Noises in ears unchanged, complete deafness on left side.

Blood-Sounds without Impairment of Conduction.

Just as inordinate conduction to the inner ear may render audible otherwise imperceptible noises, so blood-sounds may, while conduction remains normal, become noticeable by being intensified. This may be accomplished by increased cardiac activity, exertion, excitement, copious meals; locally by formation of aneurisms of vessels near the ear, etc. Furthermore, blood-sounds originating at a greater distance may reach the ear, *e.g.*, in struma and heart lesions. Thirdly, the sounds which the observer himself may hear over large vessels in anæmia and chlorosis may cause noises in the ears.

Hippocrates, according to Urbantschitsch, already designated the tinnitus in anæmia as autoauscultation of the vessel-sounds.

Tröltsch mentions tinnitus in chlorosis, originating from the jugular bulb, also in struma and wearing of tight collars.

Orne Green gives as causes of the blood-sounds:

1. Partial stenosis of internal carotid.
2. Diminished vasomotor tension of the carotid.
3. Aneurisms of vessels of the head.

Lebert considers rhythmic arterial sounds with more or less deafness, dysphagia, and signs of beginning paralysis of the vagus like dyspnœa, slowing and then acceleration of pulse, as a group of symptoms belonging to aneurism of the basilar artery.

Following are the cases of aneurism near the ear causing noises, which I was able to find:

Tröltsch mentions noises accompanying aneurism of the

basilar artery; Turnbull, of the temporal artery; Herzog and Kayser, of the posterior auricular; Spencer, of the middle meningeal; Wagenhäuser, of the carotid in the bony canal.

Poorten (Riga): Blow on the left parietal bone. Two weeks later light hammering; later, loud noise isochronic with pulse, objectively audible over the whole left, later also right side of the head. Compression of carotid of no avail. Soon exophthalmos ensued, due to aneurism of the ophthalmic artery [probably not aneurism but arterio-venous communication in the cavernous sinus. H. K.]

Tuczek observed a sound with double the frequency of the pulse, that could be heard for 12 *cm* in front of the opened mouth. Firm tamponade of the left external meatus caused it to disappear altogether. There was probably an aneurism of a branch of the posterior auricular artery.

Sounds of Uncertain Origin.

Orne Green: Two cases of subjective and objective pulsating sounds, without cardiac or vascular lesion and no anæmia nor ear disease.

Willh. Meyer: Objective and subjective pulsating sound, with good hearing on both sides, quieted by compression of the carotid. Heart sounds normal. Strong inflation produced complete cure on right side, but was impracticable and unsuccessful on the left.

Teldy observed an objective, rhythmical sound, which ceased at once when the carotid was compressed.

Meyersohn: A sound, audible with the stethoscope on the skull, ceased with compression of the carotid, but stayed away only four hours after ligature of the vessel.

Brandeis: Boy of nine years, inflammation of second, third, and fourth cervical vertebræ. A corset removed the noises, headache, and other complaints, which reappeared when the corset was left aside.

Woakes explains such sounds by assuming pressure upon the vasomotor nerves from the inferior cervical plexus,

widening of the vertebral artery, and congestion of the labyrinth.

Sounds Accompanying Struma.

Haug saw a man of forty-two with struma and continuous roaring in ears that became stormy with bending down. Cured by operation for struma.

Brandeis saw a similar case. He thinks of venous hyperæmia of the labyrinth, due to congestion of the veins of both aqueducts.

Sounds Accompanying Atheroma.

Marian: After apoplexy with paresis of ocular and facial muscles of left side, noise in left ear corresponding to pulse. Ear drum retracted. Second aortic sound strikingly clear, so that Marian thinks of atheromatous cerebral vessels.

Jacobson observed tinnitus with pronounced arteriosclerosis. The beating in the ear occasionally intermitted with the pulse.

Sounds Accompanying Cardiac Lesions.

Spirig, in a case of aortic insufficiency, heard through the otoscope a rhythmical, soft, blowing sound on the right side. It was audible over the aorta, right carotid, subclavian and brachial arteries. Plain capillary pulse on forehead and at the nails. Subjectively, at first pulsating, later continuous, sound.

Haug also observed a sound accompanying valvular lesion.

Sounds Accompanying Anæmia.

In a patient anæmic after parturition I was able to suppress the sounds as long as I made pressure on the cervical vessels. During rest in bed the tinnitus was stronger. It ceased permanently after the use of iron. In this, as well as another case with anæmic sounds, the latter ceased for a few seconds after inflation. In neither could they be heard objectively.

Meyersohn was able to suppress an objectively audible venous sound by pressure on the cervical vessels.

CONCLUSION.

The conclusions that I may draw from the cases hitherto published, as well as from my own limited but more carefully made observations, are as follows :

1. Almost all sounds should be designated by their pitch.
2. The pure conduction-sounds arise from the diminished outlet of sound, due to rigidity of the conducting apparatus. Inasmuch as the motility of the latter is required for hearing only low notes, its fixation is an obstacle to the outlet of these notes alone. Pure conduction-sounds are mainly placed between 16 and 256 vibrations.
3. The higher pitched sounds are due to processes in the inner ear. This statement is sustained by their occurrence in normal persons after such influences as are known to injure the inner ear, and also by the effect that therapy has upon them. They may be produced (*a*) by reflex from the external meatus, middle ear, and many different parts of the body ; (*b*) by changes in the inner ear or the nerve itself. In rare cases, however, low sounds may, perhaps, also originate in the inner ear.
4. Hearing of complex sounds like melodies, etc., is not *prima-facie* proof of a cerebral affection.

In respect to treatment we may formulate the rule *not to perform any grave operations upon the conducting apparatus when the sounds heard are high pitched, and especially not to attempt removal of the stapes.*

REPORT OF THE EIGHTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY IN HAMBURG

MAY 19 AND 20, 1899.

BY DR. P. RUDLOFF, OF WIESBADEN.

Translated from Band xxxv., S. 147, 1899, of German Edition, by Dr. ARNOLD H. KNAPP.

MORNING SESSION, MAY 19TH.

KISSEL, Jena, opened the meeting with an historical survey of the development of otology, and made a plea for the establishment of special departments for otology at the various universities.

1. R. PANSE, Dresden. **Description of specimens on the comparative anatomy and physiology of the so-called auditory organ.**

With the aid of anatomical and microscopical specimens, drawings, and models, the size, direction, and breadth of the semicircular canals of the sacculus utriculus and of the lagena are shown to stand in a definite relation to the main movements in the various animal classes. Transmission of waves of the surrounding water and of the air take place, first on the appearance of the pars basilaris and the simultaneous appearance of the ductus perilymphaticus and of the oval window.

Discussion: KISSEL, ZARNIKO, BEZOLD, SCHEIBE.

2. STEINBRÜGGE, Giessen. **On changes in position of Reissner's membrane; with demonstrations.**

A peculiar change in position of Reissner's membrane was noticed in the left cochlea of a man, eighteen years of age, who had died of a general miliary tuberculosis. At autopsy, traces of transient and, especially in the last stages of the disease, of increased intracranial pressure were found present. The right cochlea seemed normal, but Corti's organ on the left side was

atrophied and reduced to a small group of cells. The other structures of the ductus cochlearis showed signs of a previous inflammation. Reissner's membrane at the first turn was very much depressed, so that the ductus cochlearis seemed diminished; in the middle turn it was adherent to the crista spiralis for a short distance and then ascended to its place of attachment to the spiral ligament. In the superior turn it rested upon the membrana tectoria and Corti's organ, and rose from there directly upwards. This adherence is supposed to be due to the membrane being pushed against the ductus by the preponderance of pressure within the perilymph. The specimens also show that the endolymphatic fluid had resisted this pressure to a certain extent, as the free part of Reissner's membrane still appeared tense. (Demonstration of specimens.)

Discussion : SIEBENMANN.

3. SIEBENMANN, Bâle. **Demonstration of three cases of closure of the fossula fenestræ rotundæ.**

Politzer (*Comptes rendus du IV. congrès internat. d'otologie*, Bruxelles, 1899) found the fossula fenestræ rotundæ in the suppurating ear of a patient who had died of phthisis to be completely filled with adipose tissue, and in a second case a bony constriction of the fossula and closure with fibrous tissue containing fatty elements. The following three specimens were demonstrated :

(1) From a typhoid patient. The entire fossula is filled with pure fatty tissue. A large, slightly branching vessel passes through the midst of this tissue from the tympanum in a horizontal direction to the postero-lateral depression of the niche and then backwards and downwards through the bone to the jugular bulb (canalis accessorius aquæductus cochleæ).

(2) In the second specimen, also from a typhoid patient, the fossula fenestræ rotundæ is filled with fatty tissue only in its upper part. The lipoma as well as the remaining tympanic mucous membrane showed dilated vessels and interstitial extravasates of blood.

(3) In the third specimen the tympanic mucous membrane is thickened and the fossula is filled with a loose cellular connective tissue, through which fat cells are scattered.

As the membranous tissue which usually occupies the fossula does not contain any fatty elements, the question as to their origin presents itself. There are three possibilities :

(1) There may be a perivascular collection of fat as it occurs in the ocular conjunctiva. (2) The fatty deposits in the mucosa of the niche of the round window may be regarded as analogous to the fat nests which, according to Siebenmann's investigations and from a verbal communication of Scheibe's, are regularly present in the immediate or distant surroundings of the tensor tendon and of the facial canal and in other regions of the tympanic mucous membrane. (3) The fat has entered from one of the medullary spaces which adjoin the pneumatic cells of the middle ear.

The author has published in these *ARCHIVES* an experimental attempt to discover the effect of the closure of the round window niche on the tone perception as regards the higher tones. For the lower tones the pathological material proves to be unsuitable.

AFTERNOON SESSION.

4. KAYSER, Breslau. **An osteoma of the external auditory canal; demonstration.**

This was an unusually large bony tumor (17 mm long by 11 mm broad) attached to the posterior superior wall at the outer end of the right ear canal. The patient, forty years old, had suffered from a transient otorrhœa during youth. Seven years ago, an exostosis had been noted. In 1898, severe headache set in, and the auditory canal was completely filled by a smooth, bony hard tumor covered with a thin layer of delicate skin. At the operation the tumor became detached at its base after a few blows with the chisel, and was lifted out with difficulty. The root proved to be a small ridge near the upper margin. Healing was prompt, after a lot of pus was evacuated. The *Mt* showed a perforation at its posterior part. The discharge from the middle ear ceased, and hearing was much improved. The tumor was cancellous in structure.

5. SCHMEDEX, Oldenburg. **A tumor of the petrous portion; demonstration.**

A woman, twenty-eight years of age, had been hard of hearing for four years, without otorrhœa, but marked tinnitus, vertigo, and headache for two years. During the last month she complained of hoarseness and palpitation.

There is a small nodule in the lower and back quadrant of the drum which bleeds on the slightest provocation. Hearing very much diminished, but tuning-fork placed on mastoid process is perceived. Pupils are equal, no changes in fundus. Total left

recurrent paralysis in larynx. The pulse varies between 90 and 130. Heart normal. While in the hospital patient would lie in bed partly on the abdomen, supporting the head on the arm or hand. She would turn on her back when requested, but would soon resume the old attitude. The gait was staggering; she always sought a support. When sitting in a chair, she could move her legs. Later fever, otorrhœa, and facial paralysis appeared. At the operation there was very free hemorrhage from the bone, antrum, and middle ear; the latter was found filled with tumor masses. Further operation was abandoned. Fever and tinnitus at first disappeared, but reappeared on the seventh day. The patient became unconscious and died in coma, occupying the accustomed peculiar position.

At autopsy, meningitis with extreme hydrocephalus internus was found, and in the pyramid of the petrous bone there was a large tumor. The entire pyramid, except labyrinth, and the mastoid process were invaded. The jugular bulb was obliterated. In the region of the jugular fossa, the tumor had enlarged to the size of a walnut and extended upward through the jugular foramen projecting into the cranial cavity.

Microscopical examination revealed a small alveolar sarcoma.

The clinical symptoms, in short, were tinnitus, vertigo, peculiar position and motion, hoarseness, and palpitation. The first three symptoms are easily explainable. The tumor growing through the jugular foramen had pressed upon the cerebellum and the crus cerebelli ad pontem and caused the forced position. The vagus, glosso-pharyngeus, and accessories were also pressed upon. The paralysis of the left vocal cord and the rapidity of pulse are explained by pressure on the vagus.

Discussion: KREBS reported a case on which he had operated, where a large cyst was found in the petrous pyramid and was partially removed.

KÜMMELL said that these cysts were not well understood and only a few cases had been reported.

PANSE mentioned the fact that a similar case had been reported by Gomperz, and that in this case the tumor might have been a cholesteatoma which had disintegrated in the centre.

PASSOW had operated on a case for presumable mastoid complication after purulent otitis; a round-celled sarcoma was found.

HARTMANN described a case of round-celled sarcoma, when at autopsy a firm connection with the dura was present, which would have rendered operative intervention futile.

SCHEIBE described a case of sarcoma of the mastoid process which was permanently cured by operation.

6. SCHEIBE, Munich. **Rapid decay in acute scarlatinous otitis; histological demonstration.**

This was an unusually severe case of scarlatinous otitis which ended fatally, and where while under observation a rapid destruction of the *M*, loss of ossicles, and putrid decomposition of the secretion occurred.

A child, six years of age, was taken ill with scarlet fever; at the beginning of the second week the right ear became affected, one week later the left, with diphtheria of the pharynx, lobular pneumonia, and pleurisy; death in the fifth week.

At autopsy: pronounced emaciation, gangrenous diphtheria of pharynx and larynx, purulent lobular pneumonia in all lobes fibrinous purulent bilateral pleurisy, acute parenchymatous nephritis, and dilatation of left ventricle.

Right ear: Total absence of drum, sulcus tympanicus bare and rough, ossicles necrotic, muscles destroyed, bone in several parts of the tympanic wall eroded, some of the pneumatic cells in the mastoid filled with pus, inflammatory changes in the Eustachian tube. The same changes in the left ear.

The labyrinth on the right side is not affected. This is of interest, as from the functional examination (no whisper heard, numbers in ordinary voice only heard in immediate vicinity) a complication of the internal ear was suspected. The labyrinth of the left ear showed inflammatory changes.

It seems probable that the loss of hearing was caused by the destruction of the muscles of the ear.

Discussion: BEZOLD, JANSEN, PANSE, BRIEGER, PLUDER, report similar cases. DENKER suggests that in these cases where the loss of hearing is so marked and conversational voice can only be heard at 5 cm distance, examinations with tones, especially with determination of the hearing duration for tuning-fork tones, should be made. Autopsy had shown that in the above case the morbid process was localized to the middle ear. It would be of interest to confirm with tuning-forks if such a degree of deafness present on both sides could be followed by deaf-mutism caused by an affection of the middle ear or by a lesion in the labyrinth, not recognizable by the microscope but functional in character.

7. LUCAS, Berlin. **Examination of tones in the deaf.** A low and a high tuning-fork (c and c_4) were exhibited with appli-

ances for striking which had previously been shown by the author. He believed that with these the hearing duration could be more accurately determined than with the usual forks.

8. ZIMMERMANN, Dresden. **The value of our examination with tuning-forks, based on the re-examination of Helmholtz's theory.**

The acceptance of two sound-transmitting ways differing in character, air-conduction, and bone-conduction, was at first justified by clinical observation, and later from the results of the tuning-fork tests. Of these results the principal one, gained by Rinné's experiment, was susceptible to attack because it showed a better conduction by air, while physics teaches us that bone is several times a better sound conductor.

On closer examination it became evident that in previous tests with tuning-forks the base or handle of the fork and the prongs were considered of equal value. In the usual Rinné the handle of the fork is placed on the mastoid, and as soon as the sound is no longer perceived the other end of the fork or the prongs are brought near the ear. If, more correctly, the handle of the fork is placed near the ear in the second part of the experiment, it will be found that the sound will not be perceived after the handle can no longer be heard on the mastoid. The contrast which is usually found in the sequence of the test, and which was regarded as a contrast of the two ways of sound conduction, is explained, by the physically proven antithesis of the handle and prongs of the tuning-fork.

Other improbabilities seemingly proven by tuning-fork tests had led to the re-examination of previously accepted theories, and especially the one given out by Helmholtz on the synchronous vibrations of the drum and the ossicles.

The author has already drawn attention to the fact that in the usual sound conduction the progressive sound waves are not transmitted to the labyrinth by in-and-out motion of the plate of the stapes. They are transmitted through the substance of the drum without causing synchronous vibrations of the ossicles or stapes, then molecularly on the air in the middle ear, and finally directly to the cochlear capsule. The latter takes up the progressive wave motion and hands it over to the labyrinth fluid, where the sympathetic fibres of the terminal organ are brought into vibration.

This interpretation shows that fundamentally in sound convey-

ance there is only one way : the bone conduction is always the last and shortest part of the entire way which the sound has to travel even by air-conduction. The various distances and the various obstructions caused by intervening media explain the purely quantitative differences in the tuning-fork examinations which normally show a better sound perception for the handle direct through the bone.

The order of experiment may be changed in numerous ways as the conditions for one or both parts are modified. In the latter cases both parts must show similar changes. In the case of diminution of the perception as in senile years, hearing duration diminishes for bone-conduction as well as for air-conduction. The apparent inconsistency in those cases where a prolongation of the perception for bone-conduction is present in diminished or absence of perception for air-conduction does not seem improbable, but is only an expression of a disturbance in the ossicular chain.

Zimmermann regards the physiological purpose of the ossicular chain as a reflex accommodative apparatus ; as in the eye the ciliary apparatus furnishes the necessary space limits for the distinct perception of the rays of light, so the drum and ossicles in the ear supply the necessary time limits for the clear perception of the sound waves. The labyrinth fluid is so arranged by graduated, reflex, in-and-out movements of the stapes plate that the fibres in the terminal organ may vibrate in the amplitudes of distinct hearing. This mechanism is especially necessary for the exact functioning of the fibres vibrating in large amplitudes, and for the low tones.

This also agrees with the tuning-fork tests. If the accommodation is faulty, the vibrations of the base of the tuning-fork in bone-conduction will not cease precisely with the last sound vibration, but continue the longer the greater the degree of accommodative disturbance, and often so long that the prongs of the fork again approached will cause no sound vibrations. Subjective noises in air-conduction accompany this after-vibration in the bone, and the affected ear can no longer limit the tones and noises of the vicinity in their proper amplitude.

The author finally describes the unanimity which air- and bone-conduction show to one another and to other accompanying morbid symptoms, and thinks that from this new point of view tuning-fork tests furnish the most valuable diagnostic aid.

Discussion : BEZOLD : It is not admissible to take the difference in vibration between the prongs and the handle of the tuning-fork as an explanation for the different duration of air- and bone-conduction. Both are in motion for an equal length of time, but the movements of handle, just as a two-armed lever, are smaller but of a corresponding greater intensity.

ZIMMERMANN : The audible vibrations in the fork handle cease earlier than those at the ends ; this can be demonstrated with the tuning-forks where the simultaneous perception of the ends is excluded and which are in constant use, as Hartmann's small C fork or A fork. Diagnostically the handle and prongs of a tuning-fork are not equivalent.

SATURDAY, MAY 20TH.

STEINERÜGGE, before the commencement of the regular meeting, presented a boy, thirteen years old, with anomaly of both auricles and absence of ear canals. In the boy's first year an attempt was made to restore the canal on one side, though without success. Notwithstanding the anomaly, the boy's hearing is excellent, and permits him to go on at school. The ticking of a watch (normally 6 *m*) is heard, right close to the ear ; left at 00.2 *m* ; whisper near the ear ; medium conversation at 1 *m*.

9. RUDLOFF, Wiesbaden. **Demonstration of macroscopic and microscopic specimens.**

These specimens are shown in connection with the author's paper "On the Operation for Adenoid Vegetations with Dependent Head in Narcosis."

(1) A number of negative impressions made from plaster casts of the lateral wall of the naso-pharynx. They show the relation between Rosenmüller's fossa and the pharyngeal opening of the Eustachian tube and the great variations in the depth of these structures. Rosenmüller's fossa has usually a much greater depth than is mentioned in Merkel's *Topographical Anatomy*. Merkel states the depth at 6-7 *mm*, while Rudloff found in 15 specimens the depth to vary between 7 and 17 *mm*. Two of the casts were made from the child's naso-pharynx.

(2) A portion of hyperplastic adenoid tissue in combination with a small, 2 by 1.5 *mm* large, piece of cartilage from the tubal ridge—*i. e.*, a part of the anterior wall of Rosenmüller's fossa removed in using Hartmann's curette.

(3) Two microscopic specimens of adenoid tissue firmly connected with a small piece of cartilage from the pharyngeal ostium of the tube. There are striking changes in the cartilage, namely, cavities surrounding single cartilage cells and vessel channels.

(4) A macroscopic specimen showing the relation of the connective-tissue sheath which surrounds the carotid and the vessels and nerves passing from the head to the neck in the lateral wall of Rosenmüller's fossa.

Discussion: THOST is opposed to the statement that adenoid tissue occurs in the tube because adenoid tissue and tubal cartilage are shown in combination in the specimen. He regards the process to be due to adhesions between hyperplastic pharyngeal tonsil and tubal ridge and so are removed together at operation. The term adenoid tissue had better be dropped for the expression hyperplasia of the pharyngeal tonsil.

RUDLOFF: The specimens which have just been shown furnish an unmistakable proof that hyperplastic tissue may be present at the tubal ridge. Its presence there cannot be explained by the statements of the preceding speaker, but rather is to be considered as adenoid tissue which is present there normally and becomes hyperplastic, as it occurs in other parts of the naso-pharynx. The term hyperplasia of the pharyngeal tonsil is perfectly proper, but it must not be imagined that the hyperplastic tonsil is a sharply described structure occurring at the typical position in the naso-pharynx. In all parts of the naso-pharynx where adenoid tissue is present, hyperplasia of the tissue may take place.

SCHWABACH: I am not of the opinion that the pharyngeal tonsil is not a circumscribed structure. Embryologically it resembles the palatal and lingual tonsil. In all three the adenoid tissue develops about a depression in the mucous membrane. Aberrant adenoid tissue may appear in other regions of the naso-pharynx, as Teutleben has shown, for the tubal ostium, and later Disse, who speaks of a ring of adenoid tissue.

BRIEGER: Adenoid tufts about the tubal ridge are very unusual. In hyperplasia of the adenoid pharyngeal ring, the adenoid tissue everywhere takes part, not only near the Eustachian tube but also in the floor of the nose.

10. REINHARD, Duisburg. **Contribution to excision of the malleus and incus.** A young woman, twenty years old, had suffered from chronic purulent otitis since childhood and the

two outer ossicles had become necrotic. All attempts at bringing the otorrhœa to a stop had failed. Hearing had so diminished that whispered numbers were only heard at the ear. The *Mt* was destroyed except a smaller upper rim where a granulation presented through a perforation directly behind the short process; the tympanic mucous membrane was swollen and covered with thick pus; a rudimentary part of the handle of the malleus remained. The ossicles were extracted according to Schwartze through the canal. Carious places were found on the hammer at the head, and on the incus at the long process and the body. Otorrhœa ceased after three weeks, the tympanic wall became epidermized, and hearing improved to 5 *m* for whispered numbers.

The author pleads for a more frequent application of this mode of treatment and from the statistics of Ludwig, Grunert, and his own, finds that in 51 % of the cases the otorrhœa ceases, hearing was improved in 53 %, in $\frac{1}{3}$ of the cases it remained unchanged, and in $\frac{1}{12}$ hearing diminished.

The last condition has deterred the author from removing the ossicles in cases of deafness on one side and attic suppuration on the other, without any cerebral complications, which was only to be treated by excision of the ossicles. He usually waited under these circumstances, watching the case carefully. At the onset of any cerebral symptoms operation was of course resorted to at once.

Discussion : STACKE : The interpretation of the indications for operation in these cases has changed during the last years. Formerly it was generally accepted that the excision of the outer ossicles from the canal was a smaller and less important intervention and in doubtful cases preceded the radical operation.

Two years ago, at the meeting of this Society, I said that in cases where the drum was principally preserved, and it could be assumed that the malleus and incus were sound but that otorrhœa could not be cured without operation, the radical operation with preservation of ossicles *in situ* should be attempted and so generally cure the discharge and preserve the hearing. I have observed one case where the hearing rose from $\frac{1}{2}$ *m* before the operation to 6 *m*, at which it remained.

Other cases were equally favorable so that I endeavor to preserve the ossicles especially when their ligaments are still intact. These are surely intact in the case quoted by Reinhard where whisper was heard at 10 *m*. In that case, as the otorrhœa is not

to be healed without operation, in my opinion the radical operation with preservation of the ossicles is indicated.

Of course, we do not always know to what extent the ossicles are affected. The ossicles can always be removed later should their preservation prove needless. It should be borne in mind that not very extensive carious foci on the lateral wall of the ossicles nearly always are healed after their exposure. I cannot say whether the scar formation after this operation is always so favorable that the function is improved or retained.

SIEBENMANN is of the same opinion as Stacke.

HARTMANN mentions the fact that he presented a case at the meeting in 1890, before Zaufal or Stacke had published their papers on the radical operation, where after retraction of the auricle the antrum was exposed up to Shrapnell's membrane, and the ossicles were then extracted. In the previous year Hartmann had formulated the plan of joining the antrum, attic, and ear canal.

JANSEN considers caries of the ossicles to be secondary, and of less importance than the fundamental disease of middle ear or mastoid antrum. Isolated disease of the attic is secondary. The perforation at the superior pole, which is supposed to be characteristic for malleus or incus caries, occurs frequently in healthy ossicles. If the hearing is good, it is usually made worse by the operation. The ossicles may be freely extracted when the long process of the incus is wanting; otherwise the drum and ossicles should be preserved if the hearing is good, in fact this is a duty if the hearing in the other ear is defective. If local treatment is unsuccessful, the radical operation with preservation of the ossicles, and not the extraction of the latter, is indicated. A reason for preferring the radical operation to Stacke's is the fact that in the first method the preservation of the ossicles is more assured. The danger of displacing the ossicles can be avoided when the conditions warrant, by leaving a small bony margin at the rim of the drum membrane. Unfortunately we are often compelled to remove perfectly sound ossicles when cholesteatoma is present between the incus and the labyrinth wall. After the radical operation with preservation of the ossicles fully exposed in the attic healing takes place, inasmuch as the lateral surfaces of the ossicles are covered by a thin layer of granulation tissue. The latter then becomes epidermized from the drum membrane, starting from the posterior and upper wall. This epidermized

granulation tissue then contracts, and a very thin membrane remains covering the ossicles, scarcely restricting their mobility.

SCHEIBE : We have performed the radical operation from the beginning by leaving the ossicles *in situ*. If the opening behind the ear is to be permanent, skin-grafting must be done.

LEUTERT emphasizes that in the cases under consideration the hammer or incus, or both, are frequently carious.

SIEBENMANN : It is very important in performing the radical operation to preserve, as much as possible, the functional activity of the ear ; hence the ossicles should be retained as often as possible. In many cases we should endeavor to produce a permanent defect behind the auricle.

STACKE : In regard to Jansen's remark on the greater danger of displacing the ossicles in my operation, I cannot see how the radical operation proceeding from the antrum offers better chances than in my method of entering above the drum after retraction of the auricle. The retraction of the auricle gives us so much space that any amount of bone can be removed without injuring the drum or the ossicles.

LUCAE : I agree with Stimmel that many cases of chronic otorrhœa heal without operation.

SCHEIBE draws attention to the value of the tympanic syringe ; if the fœtor does not disappear after its use the operation is indicated.

ZARNIKO : Recovery often takes place after careful cleansing and treatment. A number of cases cured by treatment are reported.

II. BRIEGER, Breslau. **The pathology of otitic meningitis.**

Otitic meningitis may present an unusually varied course. All the symptoms characteristic of inflammation of the soft brain membranes may be absent, and the symptoms of a general infection may preponderate. The process may extend abruptly and focal symptoms may appear (aphasia, motor disturbances), simulating a brain abscess. There are intermittent forms of purulent meningitis, which later, after a number of meningeal symptoms, may lead to death. Anatomically these are represented by circumscribed meningitides, which may heal if they remain localized, or finally become general and fatal. If the cause of these meningeal attacks, located in the primary otorrhœa, usually in the labyrinth, be eradicated, recovery may take place. On the other hand, the generalization may be favored by concussion from the

chisel, as has been shown in animals. These are apt to be taken for cases of serous meningitis. The diagnosis of this form of meningitis is very uncertain, and the value of a successful lumbar puncture is uncertain. Lumbar puncture has a favorable influence, objectively apparent, even on a purulent meningitis; while the disappearance of meningeal symptoms after a simple opening of the skull urges us to judge these proofs with caution. The author then discusses the diagnostic importance of lumbar puncture generally, and cites a case where an operation for brain abscess was not made, because from the lumbar puncture meningitis was diagnosed. At autopsy an abscess was found in the temporal lobe, with fistula into the ventricle (hence the condition of the cerebro-spinal fluid), while the meninges were macroscopically normal. The favorable effect of lumbar puncture in purulent meningitis, combined with eradication of the primary ear trouble, may be of value in treating meningitis.

Discussion: LEUTERT mentioned that the leucocytes in the fluid obtained by lumbar puncture were increased in number.

JANSEN: Kronig has also found a leucocytosis. We usually designate healed cases of meningitis as serous, while there is no question but that cases of the purulent type may recover. Lumbar puncture does not always solve the question. I have observed this affection in uncomplicated serous infection of the mastoid process, most frequently in labyrinthine suppuration.

12. LEUTERT, Königsberg. **The opening of the normal sigmoid sinus for diagnostic and therapeutic purposes.**

From the therapeutic success achieved by Hoeftmann by blood-letting from the normal sigmoid sinus in the presence of severe symptoms of increased intracranial pressure, the author recommends this procedure in those cases in which general increase of intracranial symptoms are suspicious of brain abscess, without the diagnosis being positive. In Hoeftmann's, and in two cases of his own, the pressure symptoms disappeared soon after the blood-letting had been done; he thought that in future, operations for brain abscess, where the only indication present is general increase of pressure, which is not rare, as in Kretschmann's and Joel's cases, and no abscess is subsequently found, can be avoided. Leutert describes a third case where the symptoms, especially amnesic aphasia, did not disappear after blood-letting and the diagnosis of brain abscess verified at autopsy was confirmed. This procedure is in order especially in those cases

where the mastoid is to be, or has already been, opened as is the custom with otologists. In opening the sinus due attention must be paid that the respiration remain regular so that the danger of air embolism, which however need not be fatal, may be avoided. Leutert regards the opening of the sinus as not dangerous.

This step is also of therapeutic value as headache tends to cease promptly. The cases where this procedure has been tried are not sufficient to establish its value, but it deserves further trial.

Discussion : JANSEN : We often see after operative intervention such severe symptoms as Leutert has described appear or continue without permitting an exact diagnosis. A large number finally recover under expectant treatment. I fear that Leutert's procedure may easily complicate the course of the disease. To open the sinus in an affected mastoid is surely not without danger, and the less experience we have with these difficult cases the more apt are we to practise methods so as not to neglect anything. Leutert's cases were furthermore complicated as the dura was also opened. It would be better to explore the sinus outside of the mastoid. I believe however that this procedure will meet with scant favor.

BRIEGER : On account of the pressure in the cerebral blood channels danger of air embolism in the normal sinus is not very great. Brieger mentions a case where air was aspirated and air embolism followed, which necessitated ligation of the jugular. Vague therapeutic effects should be practised with caution as so many cases of cerebral symptoms recover spontaneously.

SCHEIBE thinks that Leutert's procedure can be tested in cases of accidental opening of the sinus.

JOEL warns against opening the sinuses.

LEUTERT in conclusion said that although the dura had been opened in one case no cerebro-spinal fluid appeared. He does not regard opening of the sinus as dangerous, Kuhn's fatal case being the only one on record, while several deaths had resulted from lumbar puncture.

13. BRÜHL, Berlin. **Microscopic specimens of two cases of lateral sinus thrombosis in pyæmia.**

(1) Puriform softened thrombus, adjacent to the wall. Sinus wall infiltrated with pus. Purulent thrombo-phlebitis.

(2) Carious bone ; adjacent sinus wall infiltrated with pus. Purulent thrombo-phlebitis.

14. DENKER, Hague. **Open-wound treatment after Thiersch's skin-grafting following radical exposure of the middle-ear cavities.** Denker has employed for three years a method of after-treatment by skin-grafts which he believes to have advantages over the usual treatment. He noticed that the grafts at the external part of the wound quickly became attached to the depth of the drying influence of the air; he now leaves all grafts exposed to the air with a certain protection. Skin-grafting is only resorted to when the walls are presumably healthy and there are no carious spots; the most favorable time is between the second and fourth week after the mastoid operation. To protect against hemorrhage, the granulations are curetted several hours before, with cocaine anæsthesia, and the wound is packed with gauze. The grafts are taken from the thigh and measure 5-10 *cm* by 2-3 *cm*. If such a large graft is taken with one incision in a few seconds, narcosis is unnecessary. The graft is then cut in the proper pieces and adapted to the wound surface. The wound remains perfectly open except for a gauze strip at the bottom and in the lower angle. This piece of gauze soaks up the secretion and keeps the edges of the wound apart, which show a great tendency to unite, and allows free access of air. A protector of wire netting is placed over the ear. The dressing is changed daily, and the grafts are firmly attached in from four to twelve days. A special feature according to Denker is the simplified and shortened after-treatment. The ugly prominence of the auricle is avoided.

Discussion: KÜMMELL mentions the microscopic examination of transplanted pieces of skin by Henle, and suggests the immediate transplantation on fresh wounds.

SIEBENMANN is pleased that the value of transplantation on bone is being recognized. He usually makes two long grafts.

JANSEN: The best time to graft is either at time of operation or during the first dressing. The graft may be introduced on a specimen carrier.

SCHIEBE skin-grafts directly on the granulation at the second dressing with good results. Denker's suggestions are valuable.

SCHMIDT transplants frequently, though he has never grafted on granulations, by reason of Thiersch's publications. He believes that small grafts are more favorable.

15. HARTMANN, Berlin. **On the radical operation.**

In performing the radical operation, the dilatation of the canal

and formation of a posterior flap is often difficult and tedious because the auricle and canal offer no resistance to the knife. Instead of the various contrivances, forceps, hooks, probes, etc., the author has devised an ear-canal forceps. One branch is straight and grooved like a director for the ear canal; the other branch is curved for the auricle and then straight and fenestrated to go outside the canal. The ends of the two branches grip the membranous canal. The wall is divided by a knife cutting through the fenestrated branch on the other one.

16. BRIEGER, Breslau. **Demonstration of microscopic specimens.**

(1) Specimens and drawings of an aural polyp which appeared through Schrapnell's membrane, and carried hairs. The hairs presumably grew into the perforations during an attic suppuration and had led to the formation of a granuloma with giant cells.

(2) Specimens of the so-called latent pharyngeal tonsillar tuberculosis. The tubercles contained peculiar products of a retrograde metamorphosis which appeared as degenerated elastic fibres with lime deposits.

(3) Stereoscopic photographs of pathological specimens made with the stereoscopic microscope of Zeiss-Greenough.

(4) Drawing of a tumor of the acoustic nerve.

17. BROICH, Hanover. **My method of direct vibratory massage of the Eustachian tube and its effect on the middle ear.**

After a short description of the methods of vibratory massage and an unfavorable criticism of the direct massage of the Eustachian tube with bougies, the author describes his own method, which is as follows: With the aid of special probes introduced by way of the nose a direct massage of the pharyngeal ostium and the commencement of the tubal canal is produced by Spoes's saw handle driven by an electro-magnet. The action of this method is analyzed on the laws of vibratory massage founded by Ostmann. The effect of massage is described on the normal and affected ear. The procedure can be followed by auscultation and, combined with the otoscopic image, made use of in a diagnostic, differential diagnostic, and therapeutic sense. In conclusion the rational indications are given for the use of this method alone or combined with the principal medications employed in the treatment of the chronic or subacute tubal or middle-ear catarrhs.

Discussion: THOST said that Urbantschitsch was the first to

directly massage the Eustachian tube. He also employs massage combined with the medicamentous treatment.

18. RUDLOFF, Wiesbaden. **The removal of adenoid vegetations with the over-hanging head in narcosis.**

The author has practised this method for eleven years where the danger of aspirating blood and tissue particles is avoided. Under full chloroform anæsthesia, the head is allowed to hang down, the operator's protected index finger is inserted in the left angle of the mouth, and the tongue is depressed by the assistant. The vegetations are removed with Boecker's and Hartmann's curettes.

In the presence of hypertrophied tonsils, it is better to precede with the tonsillotomy several days or weeks before. Enlarged tonsils are apt to make the breathing difficult, and may lead to asphyxia.

Rosenmüller's fossa should be entered with the curette (Hartmann's), care being taken to avoid the tubal ridge and the lateral wall. Injury to the latter structure from its relation to the sheath of the great vessels might harm the carotid.

Ten cases out of 254 required a second operation; an exact statistic of the remaining 366 was not possible.

The author operates both with anæsthesia and without. Anæsthesia is employed in excitable and timid children, and in the presence of certain anatomical peculiarities of the naso-pharynx, as when posterior wall and roof form an oblique bend and the atlas protrudes into the naso-pharynx.

Discussion: PLUDES also operates with dependent head in narcosis; he employs Beckmann's curette.

THOST has operated on 4000 cases in narcosis, but like Hopmann, Moritz Schmidt, with the head erect. He has never seen that blood or diseased particles were aspirated. He operates as soon as the corneal reflex is lost.

ENGELMANN always examines first by posterior rhinoscopy which is almost always possible in children over four years. Generally the operation can be done in a much more conservative manner than is usual. The location, and not the size of the adenoids is important. The vegetations may be large, but still not interfere with respiration. Respiration may often be made free by simply cleaning the nose of mucus. Even if the vegetations are large, a general and appropriate local treatment may cause a sufficient though slight shrinkage so that the children seem perfectly well.

SCHMIDT asks whether the vomiting after narcosis does not start up severe hemorrhage? He has operated on some cases for the second time, but has never been able to remove large pieces, and breathing was not improved.

STIMMEL is in favor of operating without anæsthesia ; he uses Beckmann's curettes.

SIEBENMANN employs anæsthesia, but bromethyl instead of chloroform, which he regards less dangerous.

In conclusion, RUDLOFF says that the possibility of the aspiration of blood or tissue fragments cannot be excluded, hence he prefers to operate with dependent head. He objects to bromethyl because it is not free from danger, the anæsthesia is too short, general muscular relaxation does not always take place, and the after-effects are more disagreeable than those of chloroform.

REPORT ON THE SIXTH INTERNATIONAL OTO-
LOGICAL CONGRESS, HELD IN LONDON,
AUGUST 8-11, 1899.

BY DR. W. JOBSON HORNE, LONDON.¹

This is the Sixth Congress and the first that has been held in the British Isles. Of the previous congresses, the first was held in New York, in 1876, the second in Milan, in 1880, the third in Basle, in 1884, the fourth in Brussels, in 1888, and the last in Florence, in 1895. The congress was more largely attended than on any previous occasion; the number of adherents, exclusive of ladies, was upwards of two hundred and fifty. The Royal Colleges of Physicians and Surgeons of London kindly lent their examination hall on the Victoria Embankment, which afforded an excellent theatre for the reading and discussion of papers and also for lantern demonstrations, whilst the large rooms on the first floor lent themselves admirably for the accommodation of the unique museum.

On Tuesday morning, August 8th, the opening ceremony of the congress was held.

The proceedings commenced with an address by Professor Urban Pritchard on the growth of otological science (a verbatim report of the address is appended).

Professor Pritchard afterwards proposed a vote of thanks to the Royal Colleges of Physicians and Surgeons for having placed at the disposal of the Congress their examination hall. He further expressed his thanks to the Royal College of Surgeons for the loan to the museum of the congress of many of their valuable and interesting specimens relating to the ear and nose; he more particularly referred to those preparations by Professor Charles Stewart illustrating the comparative anatomy of the ear and nose.

¹ The report has been furnished by Dr. Horne, one of the secretaries of the Congress, to these ARCHIVES, the *Journ. of Lar., Rhin., and Otol.*, and other periodicals.—H. K.

Sir Wm. MacCormac, President of the Royal College of Surgeons, acknowledged the vote and congratulated Professor Pritchard upon his address and on the large numbers attracted in the cause of science. Sir Wm. MacCormac concluded by expressing the pleasure it had afforded the College of Surgeons to lend specimens from their collections to the museum of the congress.

The Secretary-General announced that letters expressing regret at inability to attend the opening ceremony had been received, amongst others, from the Prince of Wales, the Lord Mayor of London, and the President of the Royal College of Physicians. He further announced the attendance of delegates Professor Lucae and Dr. Arthur Hartmann of Berlin, from the German Otological Society; the attendance of Dr. Delavan, from New York; Dr. Allen T. Haight, from the Chicago Medical Society, and also from the Chicago Ophthalmological and Otological Society; and Dr. H. A. Goldstein, from the Western Ophthalmologic and Otolaryngologic Association.

Professor Grazzi, of Florence, president at the last congress, delivered an address in which he expressed pleasure that the hopes which he had entertained of the next congress being held in London had been realized. He regretted that so long an interval had elapsed between the fourth and fifth congress and he hoped that it would not recur. He spoke of the congress in Milan and of the work of Voltolini, and referred to Sir Wm. Wilde and Toynbee who had brought otology out of the terra incognita, also to Trölsch who had contributed so much to otology in Germany and who regarded himself as a disciple of the two English pioneers. Finally he offered a vote of thanks to Professor Urban Pritchard and to the British Organization Committee for their successful efforts in promoting the present congress. He then proposed that the following telegram should be forwarded to Her Majesty the Queen.

"The Sixth International Otological Congress which opened in London this day begs, on the proposition of Professor Grazzi, of Florence, to offer to Your Majesty its respectful congratulations on the completion of the 62d year of Your Majesty's prosperous reign. From Urban Pritchard, President, Cresswell Baber, Secretary-General."

A reply was subsequently received from Sir Arthur Briggs, in the following terms:

"The Queen desires me to convey to the Sixth International Congress the thanks of Her Majesty for the congratulatory message received yesterday."

On the motion of Professor Politzer, seconded by Professor Lucae, the following were elected officers of the congress :

Professor Urban Pritchard, President ; Mr. Cresswell Baber, Secretary-General ; Dr. Thomas Barr, of Glasgow, Dr. Benni, of Warsaw, Dr. Bobone, of St. Remo, Dr. Arthur Hartmann, of Berlin, and Dr. Lermoyez, of Paris, Secretaries ; and Mr. Cumberbatch, of London, Treasurer. The above to form the Editorial Committee for the *Transactions of the Congress*.

This completed the proceedings of the opening ceremony.

Proceedings, Tuesday, August 8th.

AFTERNOON SITTING.

The President occupied the chair. The following papers were read and discussed :

Dr. E. SCHMIEGELOW (Copenhagen), "A new method of measuring quantitative hearing-power by means of tuning-forks."

Professor G. GRADENIGO (Turin), "A scheme for the uniform notation of the results of the investigation of hearing-power"; "A new optic method of acoumetry."

Dr. RICHARD KAYSER (Breslau), "Experimental investigations on the hearing phenomena in fluid media."

Dr. O. BRIEGER (Breslau), "Tuberculosis of the middle ear."

Dr. W. MILLIGAN (Manchester), "Some observations upon the diagnosis and treatment of tuberculous disease of the middle ear and adjoining mastoid cells."

Dr. ARTHUR HARTMANN (Berlin), "Congenital and acquired anomalies of the external ear, with demonstration of specimens."

Dr. ROHREK (Zurich), "The appearance of varices on the ear drums."

Dr. BOBONE (St. Remo), "The early involution of adenoid growths on the Riviera."

Dr. ALLAN T. HAIGHT (Chicago), "Naso-pharyngeal adenoids as a causative factor in ear disease."

Proceedings, Wednesday, August 9th.

MORNING SITTING.

The President in the chair. A general discussion on **the indications for opening the mastoid in chronic suppurative otitis media** was opened by Prof. Politzer (Vienna), Prof.

Wm. Macewen (Glasgow), Dr. Luc (Paris), and Prof. Knapp (New York). Prof. Lucae (Berlin) read a paper on **the radical operation in chronic middle-ear suppuration**. The discussion was then thrown open and the following took part in it : Prof. Guye (Amsterdam), Dr. Moure (Bordeaux), Dr. McBride (Edinburgh), Dr. Jansen (Berlin), Prof. Gradenigo (Turin), Dr. Noyes (New York), Prof. Kummel (Breslau), Prof. Eeman (Ghent), Dr. Brieger (Breslau), Dr. Barr (Glasgow), Prof. Faraci (Palermo), Dr. de Mendoza (Paris), Dr. Milligan (Manchester), Mr. Mark Hovell (London), Dr. Holmes (Cincinnati), Dr. Dench (New York), Mr. Cresswell Baber (Brighton), Dr. Holinger (Chicago), Mr. de Santi (London), Mr. Faulder White (Coventry), Dr. Lederman (New York), and the President. Professors Macewen and Knapp and Dr. Luc replied.

Proceedings, Wednesday, August 9th.

AFTERNOON SITTING.

Professor POLITZER presiding. Lantern demonstrations were given in the theatre by the following :

Dr. ARTHUR HARTMANN (Berlin), on the "Anatomy of the frontal sinuses and ethmoidal cells."

Dr. ALDREN TURNER (London), on the "Course and connections of the central auditory tract."

Mr. R. D. Joyce (Dublin), on the "Topography of the facial nerve in its relation to mastoid operations."

Dr. L. KATZ (Berlin) gave a demonstration in the museum of "Microscopic and macroscopic preparations of the organs of hearing," which were very much admired.

Papers were read by Dr. P. RUDLOFF (Wiesbaden), "The operation of the removal of adenoid growths with the head hanging over the table, while the patient is under the influence of chloroform"; Professor V. UCHERMANN (Christiania), "On rheumatic diseases of the ear."

Proceedings, Thursday, August 10th.

MORNING SITTING.

Prof. GRAZZI presiding.

The following papers were read :

Dr. E. MÉNIÈRE (Paris), "On the treatment of chronic suppuration of the attic." In the absence of Dr. Ménière this paper was read by Dr. Lermoyez (Paris).

Dr. MOURE (Bordeaux), "Some points in the technique of trephining the mastoid."

Dr. E. B. DENCH (New York), "The operative treatment of mastoid inflammation."

Dr. DELIE (Ypres), "Panotitis with cerebral complications; death; autopsy."

Mr. ARTHUR H. CHEATLE (London), "The petro-squamosal sinus, its anatomy and pathological importance." The paper was accompanied by lantern demonstrations.

Prof. GRAZZI (Florence), "New treatment for chronic catarrhal inflammation of the pharynx, especially in relation to diseases of the ear."

Dr. MALHERBE (Paris), "Surgical treatment of dry chronic inflammation of the middle ear, by scooping out the petro-mastoid bone with and without intubation."

Prof. AVOLEDO (Milan), "Two cases of facial complication resulting from extension of inflammation from acute suppurative disease of the external and middle ear."

Dr. LOUIS BAR (Nice), "Diagnosis of abscess in the interior of the mastoid and of furunculosis of the external auditory meatus."

Dr. COSTINIU (Bucharest), "The result of acoustic exercises on deaf-mutes."

Proceedings, Friday, August 11th.

MORNING SITTING.

Professors LUCAE and KNAPP presiding.

The following papers were read :

Dr. GOLDSTEIN (St. Louis), "Therapy of the tympanic mucous membrane."

Prof. EEMAN (Ghent), "Sclerosis of middle ear."

Dr. P. LACROIX (Paris), "The aural complications in ozæna."

Prof. POLITZER (Vienna), "On the extraction of the stapes with demonstration of histological specimens."

Prof. OSTMANN (Marburg), "On the curability of hitherto incurable deafness by means of vibratory massage of the conducting apparatus."

Prof. FARACI (Palermo), "The acoustic and functional importance of mobilization of the stapes."

Dr. G. NUOLI (Rome), "The pneumatic treatment of diseases of the ear."

Dr. FR. FISCHENICH (Wiesbaden), "The treatment of catarrhal adhesions in the middle ear by intra-tympanic injections of pilocarpine."

Dr. S. F. SNOW (Syracuse, N. Y.), "Twentieth-century prognosis in chronic catarrhal deafness."

Dr. MINK (Zwolle), "Pneumo-massage of the tympanum under high degrees of pressure."

Dr. GARNAULT (Paris), "Mobilization (three years ago) of the stapes, in a man of seventy-two years of age, deaf for forty years, absolutely so for fifteen, with great and permanent improvement in hearing."

Dr. RUTTEN (Namur) showed an "exostosis of the middle ear."

CLOSING MEETING.

Friday Afternoon, August 11th

The President occupied the chair and expressed his pleasure that an invitation had been received from France and that the next meeting would be held in the city of Bordeaux. The following were elected to form the new International Organization Committee, with Dr. MOURE, of Bordeaux, as President-elect:

America: Drs. CLARENCE BLAKE, and ORNE GREENE (Boston), DENCH, ST. JOHN ROOSA, and KNAPP (New York), GOLDSTEIN (St. Louis), BRYAN (Washington), RANDALL (Philadelphia), HOLMES (Cincinnati), PIERCE (Chicago), DALY (Pittsburg), BARKAN (San Francisco), and ROALDÈS (New Orleans).

Austria-Hungary: POLITZER and POLLAK (Vienna), MÖR-
PURGO (Triest), HABERMANN (Graz), BOKE and SZENES (Buda
Pest), and ZAUFAL (Prague).

Belgium: DELSTANCHE, CAPART, HUGET, GORIS, and COOSE-
MANS (Brussels), DELIE (Ypres), SCHIFFERS (Liège), and FEMAN
(Ghent).

Denmark: SCHMIEGELOW and HOLGER MYGIND (Copenhagen).

France: CHATELLIER, DE LA CHARRIÈRE, GELLÉ, MÉNIÈRE,
BARATOUX, LUC, CASTEX, LERMOYEZ, LUBET-BARBON, LOEWEN-
BERG, and GOUGUENHEIM (Paris), MOURE (Bordeaux), NOQUET
(Lille), and LANNOIS (Lyons), (with power to add to the
number).

Germany: STACKE (Erfurt), PASSOW (Heidelberg), KÖRNER
(Rostock), RÜPKE (Solingen), KIRCHNER (Würzburg), BRIEGER

and KÜMMEI (Breslau), LUCAF, HARTMANN, and JANSEN (Berlin), and BEZOLD (Munich).

Holland: GUYE, ZWAARDEMAKER, and POSTHUMOUS MEYJES (Amsterdam), MOLL (Arnheim), and VAN ANROOIJ (Rotterdam).

Italy: GRAZZI (Florence), AVOLEDO (Milan), BOBONE (San Remo), BRUNETTI and PUTELLI (Venice), SECCII (Bologna), FARACI (Palermo), CHINCINI, DE ROSSI, and FERRERI (Rome), COZZOLINO (Naples), GRADENIGO (Turin), MASINI and POLI (Genoa).

Russia and Poland: BENNI and HEIMANN (Warsaw), ORLOFF (Kief), PIETKOWSKI (Lublin), STEPANOFF, VON STEIN, and SCOTT (Moscow).

Spain: SUNE-Y-MOLIST, BOTEY, and VERDÓS (Barcelona), SOTÀ-Y-LASBIA (Seville), GONZALEZ ALVAREZ, and URUNELA (Madrid), MORESCO (Cadiz), and CASANOVA (Valencia).

Norway and Sweden: UCHERMANN and HORBYE (Christiania), CETERBLAD and LAGERLOF (Stockholm).

Switzerland: SECRETAN (Lausanne), ROHRER (Zurich), and SCHWENDT and SIEBENMANN (Basle).

British Empire: ARTHUR H. CHEATLE, CUMBERBATCH, DALBY, FIELD, DUNDAS GRANT, HILL, JOBSON HORNE, MACNAUGHTON JONES, LAW, URBAN PRITCHARD, and ST. CLAIR THOMSON (London), CRESSWELL BABER (Brighton), MILLIGAN (Manchester), BRONNER (Bradford), PATERSON (Cardiff), STONE (Liverpool), MCBRIDE (Edinburgh), BARR (Glasgow), SANDFORD (Cork), FITZGERALD (Dublin), BARRETT (Melbourne), and BIRKETT (Montreal).

The Chairman next announced that the jury appointed to consider the applications for the Lenval prize, founded by Baron Lenval,—to be awarded to the author of the most marked progress bearing on the practical treatment of affections of hearing since the last congress, or to the inventor of any new apparatus readily portable, which improved considerably the hearing-power of deaf persons,—had awarded the prize to Dr. CHARLES DELSTANCHE, of Brussels, for his instruments for treating the middle ear. Upon the suggestion of Professor Grazzi, of Florence, a telegram was sent to Dr. Delstanche, acquainting him with the jury's award.

The President then delivered his closing address. He thought that too much was made of the President; he was but one of the many stones which together built up the congress. He

referred to the excellent work done by the Organization Committee, and more particularly to that done by the secretary-general, and the chairmen and secretaries to the various sub-committees and by the honorable treasurer, Mr. Cumberbatch. He also tendered his thanks to Mr. George Field for his hospitality. Lastly, he spoke of the work which had been done by the Museum Committee. When the suggestion, he said, was first made that a museum should be held in connection with the congress he was delighted, and still more so when Mr. Ballance kindly undertook the chairmanship, putting into the work all his enthusiasm. They had all worked with a will, and no two more so than Mr. Arthur Cheatle and Dr. Jobson Horne. The museum grew and grew, and the results which had so pleased them all had been worth the labor. After the museum had been dispersed, he said, and even after another museum of the kind had been formed, the catalogue would be a work of reference, useful to all otologists. He concluded by expressing his indebtedness to all the members of the congress who really formed the foundation layer of its success.

A hearty vote of thanks to the President, proposed by Professor GRAZZI, was carried by acclamation.

Dr. BENNI, of Warsaw, in the name of the foreign members, proposed a vote of thanks to the Organization Committee, to which Mr. Cresswell Baber replied and expressed the hope that the results of their work would be an encouragement for the future study of otology.

Professor POLITZER, speaking in English, said : " Mr. President and Gentlemen,—In every congress there is always one outstanding feature which remains in our memory forever ; it will, I think, be allowed by every one here present that the outstanding feature of this congress has been the museum. I have attended every otological congress up to the present, and also seen every important museum in the world, and I do not hesitate to say that I have never before seen such a magnificent and well-organized museum, and I doubt if it will be possible to see such a one again. This result is due to the exertions of Mr. Cheatle, ably assisted by Dr. Jobson Horne. Those of us who have had to arrange specimens in the museum will join with me in giving unlimited praise to these two gentlemen for the never failing urbanity, their suavity of temper, and their amiable behavior in the midst of very trying circumstances. I take upon

myself to express to these gentlemen the thanks of the congress for their incessant and indefatigable labors which have so materially helped to render this congress such a great success."

Mr. CHEATLE thanked Professor Politzer for his kind expressions, and after a few farewell words from the President, the Sixth International Congress was brought to a close.

PRESIDENT'S ADDRESS,

"THE GROWTH OF OTOLOGICAL SCIENCE," delivered Tuesday morning, August 8th.

By the President, URBAN PRITCHARD, M.D. Edin., F.R.C.S. Eng.,
Professor of Aural Surgery in King's College, London.

In the name of the British Organization Committee, and in the name, indeed, of all British otologists, I wish to offer a very hearty welcome to our foreign colleagues and to their ladies.

We thank you most sincerely for coming here, in many cases, hundreds—nay, even, I may say, thousands—of miles, in order to assist at this, the Sixth International Otological Congress, and I trust that your visit to London will be a very pleasant one; at any rate, I may certainly promise that we will do all in our power to make it so.

There is, however, one serious difficulty which, with all the good-will in the world, cannot be removed. I refer to the fact that, owing to the immense size of this London of ours, so much loss of time is entailed in getting from place to place. When I remember how conveniently we were located during the pleasant gatherings of congress at Basle, at Brussels, and at Florence, and the ease with which we were enabled to find our way about, I cannot help regretting that our vast metropolis cannot be, for the moment, brought within more manageable compass; but as that is impossible, we must content ourselves with doing the best we can under the circumstances.

In bidding you welcome I have used the word "foreign" to our guests; but I do not like that designation in connection with our congress. For *Science* acknowledges no differences of nationality; she is, herself, all in all, and faithfulness to her the sole condition of citizenship in her kingdom.

Therefore let us regard ourselves, not as under our national

flags, but as assembled in common brotherhood, marching together under the banner of Otology, and forming one part of that army commanded by Science which is engaged in overthrowing the foes of humanity, those foes which have Ignorance, Vice, and Prejudice for their leaders.

Personally, I feel a thrill of pleasure in seeing so many valued friends assembled again for conference ; and of these may I be permitted to mention the names of Professor Politzer, Professor Guye, Professor Lucae, Dr. Arthur Hartmann, Professor Knapp, Dr. Ménière, and our last President, Professor Grazi.

But it is a real grief to miss some old familiar faces. The genial President at Basle, Burkhardt-Merian, dear old Sapolini of Milan, Moos of Heidelberg, and Delstanche (père) of Brussels, these are honored names which will long be remembered in the annals of otology, though they themselves have passed "behind the veil."

Again, since our meeting in Florence, our branch of medical science has lost another faithful servant. I allude to Dr. Meyer of Copenhagen, whose name in connection with the discovery of post-nasal adenoids is so justly renowned. Lastly, among other names that must occur to each one of us, I will only refer to those of Professor Colladon of Geneva and Hewetson of Leeds, who were both to have taken an active part in our proceedings this week.

We deeply regret also to note the absence, from unavoidable circumstances, of several friends whom we should so gladly have welcomed among us to-day ; and I am especially grieved that ill-health has prevented Dr. Charles Delstanche, our hospitable President at Brussels, from being at his accustomed place on this occasion,—I believe that it is the first time that our Otological Congress has not had the support of his energetic and cheery presence.

Now, friends, it seems to me that at the opening of our congress it is well that we should recall briefly the story of the birth and growth of otological science, and with your permission I will say a few words on this subject now, dwelling more particularly on the advances made in it during the last thirty years.

Although **Toynbee** is generally acknowledged to be the father of modern otology, for the date of its birth we must go back some 3400 years to the then flourishing country of Egypt. For Professor Roosa, in his excellent treatise, refers to a certain ancient papyrus

(called, after its discoverer, the Papyrus Ebers) on which is written a monograph on "Medicines for ears hard of hearing" and "for ears from which there is a putrid discharge." And here, in our museum, may be seen a confirmation of the fact that ear troubles not only existed in those days, but that they could be cured; for we have the good fortune to possess a curious old Egyptian relic, consisting of a wooden tablet on which is portrayed, in bas-relief, two effigies of the Sacred Bull, and two Auricles. This was undoubtedly a votive offering to the god Hathor from some "grateful patient."

In spite of its early birth, however, otology, except perhaps with regard to its anatomy and physiology, did not make itself of great importance until the second half of the present century. It is true that here and there a surgeon might have been found who had turned his attention, to some extent, to this subject; and, indeed, our own Royal Ear Hospital in Dean Street, Soho, which is acknowledged to have been the first successful aural clinique in Europe,—and I believe in the world,—was established in 1816. But, speaking generally, we may safely assert that aural surgery continued to be more or less in the stage of infancy until between 1840 and 1860, when the study was vigorously taken up by Sir William Wilde and Toynbee, who thus gave a fresh impetus to the study of the pathology and treatment of diseases of the ear. Even then its importance was by no means generally recognized; indeed, only thirty years ago it was a favorite saying of more than one celebrated surgeon, that "ear diseases may be divided into two classes: those which can be cured by any general practitioner, and those which, being incurable, may be relegated to the tender mercies of the ear specialists."

Is it any wonder, therefore, that in those days aural surgery was not only considered to be, but actually was very much mixed up with the name of quackery; for, as scientific men refused to have anything to do with it, the door was left open for any charlatan to enter, and many strange stories gained credence as to methods of treatment which the patient was required to undergo. Indeed, one of my earliest boyish recollections of aural surgery was hearing the story of how a child, a deaf-mute, had been cured by a skewer having been passed through his head from one ear to the other. Although a somewhat better knowledge of anatomy has since made me doubt the accuracy of this statement, still it is certain that strange things were both said and done in the

olden times, which did not redound greatly to the honor of the specialist.

In my own student days I well remember the sarcastic manner of Professor Partridge—Dicky, as we used to call him at King's College—when he said, "Ah, gentlemen, a little wax is a godsend to an aurist"; meaning, of course, that its removal was an easy method of earning a reputation. And, no doubt, there is a certain truth in these words, though not exactly in the sense implied by the good old Professor; for which of us has not found that, by removing a plug of serum which has either not been diagnosed or which has resisted all the efforts of the general practitioner to dislodge, we have gained kudos and an appreciation which many of our more delicate operations have failed to secure.

Yes, otology had indeed a hard battle to fight before it could be said to have won honorable recognition among men of standing in the medical profession; and I shall never forget the letter which one of these wrote to me in 1872, when he first learnt that I intended to devote myself to this branch of study. After lamenting my decision, however, he did conclude by saying: "Now I suppose that I must not regard all aural surgeons as quacks." And may I add, as a kind of commentary on this letter, that within a few years afterwards the writer of it came to me as a patient.

Things have indeed changed since then, for, instead of a few aural surgeons scattered here and there in Great Britain, we have now at least a couple of hundred; while the number of clinics in London alone has been increased from two to three, to near upon twenty. And in many other countries this branch of medical science is even more strongly represented.

As a natural result of the increased interest in the work, let me call attention to the unique museum connected with this congress, wherein is to be found the largest and most valuable collection of otological specimens, a collection which could only have been brought together by the union of our international forces. The museum is so complete that if you had come to visit that alone your trouble would have been repaid.

But in one respect there is still room for improvement. I refer to the need for the better recognition of otology by our universities and colleges. I am glad, however, to be able to report that one step has lately been made in this direction, for the University of Edinburgh has now made it one of the qualifying subjects for

her medical degrees, and I look forward, with hope, to the time when her example will have been generally followed.

This "new departure" will, I trust, lead to a fuller recognition of the position of teachers of aural surgery. In this respect we, in the British Isles, are sadly behind other countries, where chairs of otology are numerous; whereas here, among all our universities and colleges—where so many able lecturers are to be found—in King's College, London, alone, is the dignity of a professorship conferred upon its teacher of aural surgery.

Let me now pass in brief review the progress of the last thirty years.

So far as the **anatomy** and **physiology** of the auditory apparatus are concerned, comparatively little has been added to the store of knowledge already gained, although a more intimate study of its parts has made that knowledge more complete and precise.

In **pathology**, as might be expected, there has been considerable advance.

In disease of the meatus, although aspergillus was discovered before this period by Meyer, Schwartz, and Wreden, yet it was not elaborated with any fulness until later. Also, the nature and classification of exostoses have been worked out within this period.

Our knowledge of the changes in chronic middle-ear catarrh, and in sclerosis, has considerably advanced, although much here yet remains to be done.

The effect of pathological conditions of the nose and nasopharynx upon the auditory apparatus, adenoid vegetations more especially, has practically been discovered. The world has yet to learn what it owes to Wilhelm Meyer.

In chronic suppurative catarrh, disease of the ossicles, the implication of the attic, the antrum, and the mastoid cells have been worked out; also the intercranial complications which sometimes follow. The nature of the granulations and polypi are now better understood; and although Toynbee had already called our attention to cholesteatoma, its pathological importance in connection with mastoid disease was not fully realized until quite lately.

In the pathology of labyrinthine disease there has not, perhaps, been so much advance; but Ménière's disease is now better understood; and Politzer has made known to us a disease of the

bony capsule. Finally, the pathology of congenital syphilis affecting the internal ear has been partially worked out.

Our **means of diagnosis** have been considerably improved.

The diagnosis between affections of the conducting apparatus and the auditory nerve, which formerly was often confused, is now much more easily made out ; this is chiefly due to the study of the tuning-fork.

Methods of illumination have very greatly improved, to the immense advantage of the surgeon.

Bacteriology, again, has done much, and, in all probability, will do even more in the future, to help us in our diagnosis. Unfortunately, the essential apparatus is enclosed in such dense bone that the Röntgen rays have been of but little assistance.

In **treatment** there have been immense strides.

Even in chronic middle-ear catarrh and in sclerosis, those diseases which hitherto have baffled our most strenuous efforts, a distinct advance has been made indirectly, especially in prophylaxis, by treatment of the nose and naso-pharynx.

In suppurative disease there has been very great improvement in treatment. By means of boric acid, alcohol, and other suitable antiseptics, simple otorrhœa has become much more manageable ; and a far larger proportion of such cases are now healed, even without operation.

In the case of its complications,—caries, granulations, and polypi,—the advance made is most striking, and, in consequence, the large protruding polypus is now rarely seen ; and no aural surgeon at the present time would be able to show so large a collection of those as Dr. Warden, of Birmingham, was in the habit of displaying some twenty-five to thirty years ago.

Curetting of carious spots, and the removal of ossicles, so important in the treatment of many cases, has only recently been introduced.

This brings us to the wonderful stride made in the treatment of antrum and mastoid disease, for which we have chiefly to thank Professors Schwartze and Stacke, although many others have contributed to the advancement. How much agony has been relieved, how many lives have been saved, by these operations !

And, gentlemen, this advance of surgery has carried us still farther ; for, by the joining hands of general surgery and otology, intercranial suppuration has been robbed of many of its victims.

But how, and why, is this ? How is it that, formerly, our

surgeons were unable to cope with these intercranial conditions? How is it that, now, we are able to operate on the tympanum, attic, and mastoid, practically with impunity?

Gentlemen, this is due to the adoption of **antiseptic surgery**. May I beg your indulgence for proudly claiming to be pupil, colleague, and brother professor of him whom I regard as the greatest man living to-day,—Lord Lister? Were it not that you would exclaim at my inconsistency, I should be tempted to add “compatriot” also. But yes, gentlemen, I will add the word. Not, however, in the sense in which I was just about to use it, that of English nationality; but with reference to that ideal country to which I alluded at the beginning of my speech, and of which we otologists are all the naturalized subjects. Here, on the common ground of our chosen land, the land of Science, we may all proudly claim Lord Lister as our compatriot, all rejoice to serve under such a leader in the battle against disease and death. The world does not as yet understand the full benefits which he has conferred upon mankind, but we, naturally, being his compatriots, have a better opportunity for doing so; and I can only add my earnest conviction that it is by faithfully following the counsels of our superior officers that our advancing column can best secure future victories.

Such, ladies and gentlemen, is the brief, and therefore necessarily inadequate, record of the progress of otology which I desired to lay before you.

We have seen that this nineteenth century, which has brought to the world so many wonderful blessings in other directions, has not been unmindful of our branch of medical science. For, whereas at the commencement of the century the ear was regarded almost as a terra incognita, scarcely worth consideration except as the seat of one affection only,—that which was generally known as “a deafness,”—now at its close, this organ is fully explored ground, and has been proved well worth exploration. Otology has been raised from the rank of pseudo-quackery to an honorable position in scientific surgery, and its importance and bearing upon the body as a whole are now fully recognized.

But while we rejoice in the progress made in the past, we must remember that much still remains to be done. For instance, we have yet to clear away that opprobrium of aural surgery, namely, the chronic non-suppurative disease of the middle ear. Shall we, in the near future, be enabled to cope successfully with this

hitherto invincible foe? Judging from the advance made in other directions, I am bold enough and sanguine enough to think that we shall; and, assuredly, when that help comes we shall all unite in blessing its victor.

Now it is the province of our otological congresses to take this and similar problems into consideration. But the real value of these gatherings is not to be measured merely by papers and discussions. This is one of their uses, it is true, for interchange of ideas is always good; still, the chief value of thus meeting together with others who are all interested in one common subject, is the kindling of enthusiasm which is thus engendered,—an enthusiasm which should serve to stimulate older and younger members alike to renewed efforts in the paths both of research and of practical treatment; and therefore, in conclusion, I desire most heartily to wish that this, our Sixth Congress, may be successful in all these directions.

Tuesday, Aug. 8th.

AFTERNOON SESSION.

The following papers were read:

Dr. SCHMIEGELOW (Copenhagen) read a paper on **a new method of measuring the quantitative hearing-power by means of tuning-forks.**

Many experiments, he said, had been made in later years to find a reliable method. There were the methods of Hartmann, Gradenigo, and Zwaardemaker, which, however, could not be called satisfactory, as they did not give exact results. In order to use the time and vibration of certain tuning-forks in measuring the hearing-power, it was necessary to know the vibration curve. If it were possible to measure the amplitude of each tuning-fork from the moment it was set in vibration to the moment when the tone died away, the difficulty in using forks as reliable tests of quantitative hearing would be solved. In the light of our present knowledge the amplitudes of the deeper forks only were measurable. Bezold and Edelmann had, by means of a very cleverly invented instrument, constructed vibration curves of the deeper forks (from D' to F), and from these they constructed a standard curve. They furthermore presumed that this curve, being almost the same in all the deeper forks, must be the same for every fork, even the highest ones. It seemed, however, said Dr. Schmiegelow, that Bezold and Edelmann had started from wrong conclusions, and that the result of their experiments did not agree with theory.

According to theory, the amplitudes decreased in an approximately geometrical progression ; that is to say, the logarithms of the amplitudes diminished directly with the time. This theory was no doubt correct, but only as far as the small amplitudes were concerned (Jacobson), or, in other words, the logarithmical decrement was greater and irregular at the beginning, but towards the end it became nearly constant. By a very carefully drawn mathematical diagram, Dr. Schmiegelow showed that in an examination of the curve found by Bezold and Edelmann it would be seen that the differences between the logarithms of the amplitudes corresponding to the time of 0-10-20, etc., 100 seconds to begin with, decreased as they ought to do, but afterwards increased, which they ought not to do. According to theory, they should expect that the difference, after decreasing as it did to 0.151, ought to remain pretty nearly constant. The difference, however, increased again, which meant that for some reason or other the vibrations were impeded at an increasing rate, and the curve therefore not correct. Everything tended to prove that the curve of the higher fork was different from that of the deeper ones, and that such fork had its own special curve. In order to find the curve of vibration for each tuning-fork G. Forchhammer and I proposed the following method : A tuning-fork is struck, and the time during which it is heard at different distances from the ear is determined. The abscisses of the curve represent the distances, the ordinates the time of perception. The correctness of this method, said Dr. Schmiegelow, was founded on the fact that the amplitude was proportional to the distance at which the tone disappeared, the intensity of the tone being constant when the "Hörschwelle" was reached of the moment at which the tune ceased to be heard. The method was also practicable, in so far that instead of the microscopic amplitudes the macroscopic distances were measured, an advantage which was all the greater because the amplitude of the higher tuning-forks could not be measured microscopically. The forks examined were made by Edelmann in Munich, and were C G, c g, c¹ g¹, c² g², c³ g³, all of them unloaded.

The experiments were made under as good conditions as could possibly be procured in the open air at some distance from town. If, for instance, they were going to find the curve of the c¹ fork (261 vibrations), they would proceed in the following way : By six series of experiments they found that c¹ properly struck would

be normally heard for 7 seconds at a distance of 160 *cm.* from the ear, 14 seconds at a distance of 80 *cm.*, 23 seconds at 40 *cm.*, 37 seconds at 20 *cm.*, 62 seconds at 10 *cm.*, 88 seconds at 5 *cm.*, and 117 seconds when held as close to the ear as possible without touching it. According to the theory, the differences between the time at a distance of 5-10 *cm.* and the distances 10-20 *cm.* should be the same, because close to the ear, where they had to do with small amplitudes, the time increased at an arithmetical ratio (with constant differences) if the distance diminished at a geometrical ratio. This theory was actually proved by the experiments. At the beginning of the curve (from 160-20 *cm.* distance) they found that the differences in time were smaller at the greater distances from the ear, that they increased up to about 20 *cm.* distance, and then became constant as far as the final part of the curve was concerned. The fact was that a tuning-fork did not emit the tone from the external surface of the prongs, but the vibrations were presumed to spread out from two points which were situated between the external surfaces of the prongs. By a series of experiments they had found that the distance between the tone centre and external surface of the tuning-fork was about 1 *cm.* in the forks C G, c g, c¹ g¹, and c², whilst the distance was about 1.5 *cm.* in the forks g² c³ g³ c⁴ g⁴ c⁵. As the distances were reckoned from that surface of the prong which faced the ear, they must therefore add to the distance 5-10 and 20 *cm.*, the distance of the tone centre from the external surface of the tuning-fork. With regard to the fork c¹ the addition would be 1 *cm.*

They were now able by means of calculated value of *x* and other experimentally found data to construct the curve for c¹.

If a patient heard the fork c¹, for instance, 7 seconds, the fork being struck powerfully and held close to the ear, it meant that the patient's minimum hearing-amplitude, or his "Hörschwelle" (threshold of audition), was $\frac{160}{1.3} = 123$ times the normal for the distance. His hearing-power $\frac{1}{(123)^2} = \frac{1}{15129}$ of $\frac{1}{123}$ times. If the normal hearing-power is equal to 1, the reduced hearing-power would be equal to 0.00007. Supposing, on the contrary, the patient heard the fork 62 seconds, his minimum hearing-amplitude would be $\frac{11}{1.3} = 8.5$ times the normal for the distance. His hearing-power $\frac{1}{(8.5)^2} = \frac{1}{72.25}$ times 1 normal $\frac{1}{8.5}$ times the normal, and = 0.0138 if the normal hearing-power was equal to 1.

In this way they were able to construct the curve of every tuning-fork, and thereby to find how much the hearing-power was diminished, if they only knew the time for which the fork was heard at a certain distance from the ear.

By comparing the curves of the different forks, they now saw how greatly they differed. Some of them—the deeper forks—were steep and short; others—the higher forks—were flattened and long. In other words, the assumption of Bezold and Edelmann, that the curves were always the same, was not correct, and one employing their method could not get at reliable results. This could easily be illustrated by some examples. For instance, the forks c - g^1 - c^2 - g^3 - c^4 . They were, according to his experiments, normally heard close to the ear during 328, 202, 162, 55, and 43 seconds, respectively. Suppose they had a patient who heard these forks only for half the time, the normal hearing-power would, according to Bezold and Edelmann, for all tuning-forks be equal to $0.049 = \frac{1}{20}$. If, on the contrary, they used the special curve of each fork, the result would be quite different, because they found that the decrease of the hearing-power for c would be equal to $0.026 = \frac{1}{39}$ of the normal hearing; g^1 , $0.012 = \frac{1}{84}$ of the normal hearing; g^3 , $0.00006 = \frac{1}{17354}$ of the normal hearing; and c^4 , $0.000025 = \frac{1}{40000}$ of the normal hearing.

The enormous difference between the results given by this and by Bezold-Edelmann's method was obvious. He therefore believed that if one wished to use the time in which a fork was heard to measure the quantitative hearing-power, it would first of all be necessary to know the curve of the forks employed. In order to find these curves, he hoped the method he had given would be useful.

Dr. SCHMIEGELOW, replying to questions by Professor POLITZER and Dr. DUNDAS GRANT, said the experiments he had carried out were in connection with the mathematical aspect of the hearing-power. In the clinical work they had used the very good and practical methods of Dr. Hartmann, but he thought they were far from reliable. If they wanted to compare the result of the hearing-power by the different tuning-forks, and to know the influence on the voice, they could not get any certain basis to work upon. He was only as yet on the fringe of the question.

Professor GIUSEPPE GRADENIGO (Turin) read a paper on **a scheme for the uniform notation of the results of investigation of hearing-power.**

The methods which he proposes have been already for some time used with good practical effects in the Clinic and in the Polyclinic at Turin. The language employed is Latin. The various experiments are indicated by the initial letters of the authors' names who have described them. Here is the scheme :

AD
S (18") W R (+ 16"), H, Hm, Ht, P, v, V,
AS
AD
C c c¹ c² c³ c⁴ c⁵.
AS

Explanation.

AD, AS = Auris dextra, auris sinistra.

S = *Schwabach's* experiment (c = 128 vibr.). Duration of normal perception with own tuning-fork c = 18".

W = *Weber's* experiment (c). An arrow designates the side towards which the lateralization takes place.

R = *Rinne's* experiment (C). Normal perception with own tuning-fork C = + 16.

H, Hm, Ht = *Horologium*, watch per æer, ad mastoidem, ad tempora.

P = *Politzer's* acoumeter.

v = vox aphona, whispering voice ; V = vox communis, conversational voice.

The results of the measuring of the hearing-power for the various tuning-forks are expressed in hundredths of the normal duration of perception.

The following example will better demonstrate the method :

S (18) + 6 W	/ AD—S		prope		+	+	> 5	0.30—0.15	> 5
	R (+ 16)		H	Hm	Ht	P	v	V	
	AS—15"		05	+	+	> 5	2.00—1.00	< 5	
AD	12	42	72	95	100	95	100		
	C	c	c ¹	c ²	c ³	c ⁴	c ⁵		
AS	50	80	87	95	100	100	100.		

Professor GIUSEPPE GRADENIGO read a paper on **a new optic method of acoumetry.**

If we paint at the end of one of the branches of a tuning-fork which vibrates with sufficient amplitude a distinct figure (say a tall triangle), this figure will appear more or less doubled. The two images will overlap, the overlapping part being very distinct in outline and color (*field of double image*), while the separate

portions will be much paler and less distinct in outline (*field of single image*). As the vibrations diminish in amplitude the "field of double image" becomes greater—the two images gradually merging into one. The growth of the field of double image corresponds to the diminution of the amplitude of the vibrations of which it thus becomes a measure.

When we choose a figure in the form of an inverted **V** (**Λ**), black upon white ground, and if we mark it transversely with lines or steps forming various segments (*models and photographs shown*), we can in this manner obtain an exact index of the amplitudes of vibration at any instant of the tuning-fork's decrement. Since the amplitude of vibration is directly proportionate to intensity of the sound, we have thus an excellent clinical method of acoumetry. Professor Gradenigo expressed his thanks to Dr. G. Ostino, Professor C. Reymond, Dr. C. Gaudenzi, and Dr. O. Pes for their valuable help in these researches.

The best results are obtained with forks whose branches make wide excursions (up to 60 vibrations a second); but the method can also be used with forks up to 250 vibrations.

As the examination with low notes is of great value in the study of the affections of the sound-conducting apparatus, the method is very useful in spite of this limitation.

Of the facts which he had been able to elicit, he wished only here to refer to the two following ones:

1. In the vibration period measured with the said method, the decrement of amplitude goes according to the geometrical progression in proportion to the time.
2. The individual mistakes in the appreciation of the duration of the sound-perception in persons not accustomed to this kind of researches—that is, in most of our patients—are much greater than one would believe without such a direct objective control.

Dr. R. KAYSER read a paper on **experimental investigations of acoustic phenomena in fluid media**.

The final sound-vibrations, Dr. Kayser said, which determine hearing, take place in the cochlea, and therefore in a fluid medium. It has hitherto been impossible to investigate the conduct of vibrating bodies in fluids, because there has been no means of recognizing with any ease the vibrations of a body in water. He said he had, however, found a method of overcoming the difficulty. It consists in the use of a telephone, which is so modified that the plate of metal is surrounded on all sides by liquid. (Dr.

Kayser then gave a description of this water-telephone.) By means of this method it has been easy to prove that spoken sounds, or the sound of a tuning-fork in front of the plate, throw the metallic plate into feebler vibrations than when there is no water present. Low tuning-forks from C^1 downwards, and high ones from c^4 upwards, are not heard at all. If we imitate the conditions in the ear, with two openings closed by means of membranes (*fenestra ovalis* and *fenestra rotunda*), and put one of these openings in communication (by means of a *columella*) with a membrane corresponding to the *membrana tympani*, the following takes place : If the second opening is closed by means of any unyielding mass so that a distension of the fluid outwards is prevented, then the production of a sound in the telephone is no weaker than when similar distension of the fluid is present. It thus appears to result from this experimental proof that the molecular vibrations of the auditory ossicles have a greater significance than they were credited with according to the theory of Helmholtz, at present held. Further, it is proved by means of the water-telephone that the diminution of the intensity of vibrations is increased in proportion to the bulk of liquid which lies upon the metal plate, and the degree of its viscosity. In glycerine or milk the diminution of the intensity of the vibrations is markedly greater than in water.

Professor LUCÆ said : It is not surprising that the sound should get weaker whenever you put a sounding tuning-fork into the water ; it is new, however, that certain sounds, the higher and lower ones, should get lost. If you put a sounding tuning-fork into the water, the sound gets lower up to the extent of an octave. Whether the human voice gets so much lower too is the next question. Because the sound gets so much lower by the pressure of the water, it does not necessarily imply this.

Dr. KAYSER, closing the discussion, said : It is a well-known fact that the pitch of a tuning-fork diminishes under water, but I do not know whether it is as much as an octave. However, with the telephone under water this could be easily proved. The tuning-fork is brought to sound under the water, and the receiver on the other end will give undeniable evidence. The lowering may be a fifth, but hardly an octave. The human voice is not influenced. It may be difficult to prove that actually, but so far I could not find any evidence of it.

Dr. E. COOSEMAN (Brussels) read a paper on the **hearing-power of "beetlers."** Contribution to the study of "occupation" deafness.

We have long recognized the injurious influence exerted on the organ of hearing by certain manual occupations carried on in the midst of a violent noise. Among these "noisy occupations" mention has not yet been made of the "beetler,"—that is to say, of the worker in linen,—who carries on his occupation in the midst of the noise of the "beetling" machine, composed of twenty metallic hammers, each weighing 100 kilos and giving 400 strokes a minute. In the workshop of which the workers have been examined by the writer, there are twenty machines of this kind or similar to them. When all the machines are working together we may calculate that they give 160,000 strokes in the minute. The noise thus produced resembles the continuous rolling of thunder, which shakes the workshop and everything in it.

The number of workmen examined amounted to seventeen. Most of them were seen a few hours after leaving the factory. All complained of hearing badly immediately after leaving off work; but the delicacy of hearing returned by degrees after two or three hours to such an extent that, after their Sunday repose, they felt that they heard almost as well as other people of their age.

The workers examined have been exposed to the "beetle" for a length of time varying from two to thirty-nine years, six days every week, from six in the morning to six in the evening.

The remarkable fact, which at first sight seems almost incredible, is that not one of them is absolutely deaf, not even a man of sixty-one years of age, who has worked at the "beetle" machine for thirty-nine years. His hearing is absolutely normal.

In fourteen out of the seventeen the writer has detected various lesions of the nose, of the pharynx, of the ear, or the presence of inveterate habits of the abuse of alcohol or tobacco, which predispose to the diminution of hearing.

The author explains the innocuous character of the noise in question to the fact that it is extremely dull, although violent, and that it is continuous instead of being intermittent, as in many other occupations.

The writer has come to the following conclusions:

All noisy trades are not necessarily injurious to the hearing.

In order that they should be injurious the following conditions are necessary :

1. That the workmen should be predisposed to affections of the ear by the existence of lesions of the nose or pharynx, or else by inveterate addiction to alcohol or tobacco.
2. That the noise should be intermittent.
3. That it should be of a comparatively high-pitched tone.

D. G. (*Trans.*).

Dr. W. MILLIGAN (Manchester) read a paper on **some observations upon the diagnosis and treatment of tuberculous disease of the middle ear and adjoining mastoid cells.**

Mr. President and Gentlemen,—The widespread interest which has of late been manifested in this and other countries in the endeavor to check the ravages of tuberculous disease in its numerous forms has an interest to the otologist, not only on account of the general merits of the case, but more especially on account of the frequency with which tuberculous lesions are met with in and around the middle ear.

The factors which come into play in producing tuberculous lesions of the middle ear and its adnexa are but imperfectly understood, and their investigation opens up a wide field for research and experiment.

Does the bacillus gain entrance to the middle ear by way of the Eustachian tube, or is it conveyed along the vascular or lymphatic channels? What also is the relation between tuberculous naso-pharyngeal adenoid vegetations and tuberculous middle-ear disease?

Questions such as these are not easily answered, and yet their solution must appeal to all as being of much importance.

For some years past I have been particularly interested in this subject, and as opportunity has presented itself, have endeavored to investigate these questions both in their practical and in their scientific aspects.

That a large proportion of the cases of suppurative middle-ear disease with accompanying bone lesions met with in practice are of a tuberculous nature, will, I think, be admitted by all, and that the prognosis in such cases is not very favorable will, I believe, be conceded by those who have had large clinical experience.

The characteristic features of tuberculous middle-ear disease may be somewhat masked on account of an accompanying pathogenic infection, and an accurate diagnosis may be impossible if

one relies upon finding the bacillus of tubercle in the secretion from the middle ear.

Time after time it has been my experience to examine cover-glass preparations of pus from the middle ear for bacilli, and with negative results, although the tuberculous nature of the lesion has been proved beyond all doubt by means of inoculation experiments and by the subsequent clinical history of the case.

In my experience primary tuberculous lesions of the middle ear and adjoining mastoid cells are comparatively common, especially among the children of the poorer classes, and I believe also that secondary tuberculous infection from such a primary focus is by no means of infrequent occurrence.

Amongst causes which may be considered predisposing are the following: (1) hereditary tendency; (2) unhealthy environment; (3) unsuitable feeding; (4) exposure to infection from tuberculous relatives; (5) the presence of tuberculous nasopharyngeal adenoids.

The relation of nasal obstruction to tuberculous middle-ear disease deserves special consideration. In many of my cases post-nasal adenoids have been present, and in a small proportion have themselves been tuberculous. The almost constant degree of Eustachian catarrh which their presence implies produces a soil which is favorable to the growth of the tubercle bacillus, and once it has found a footing in the middle ear the conditions favorable to its development are present, viz., a suitable soil, absence of light, a more or less uniform temperature, etc.

In the early stages these tuberculous foci appear as slightly elevated yellowish points in the mucosa, after a time coalescing and breaking down to form superficial ulcers.

Should the deposit occur upon the inner aspect of the membrane, perforation ensues. Such perforations may be multiple, and the destruction of tissue is usually quite painless. The edges of such perforations have a pale, indolent-looking appearance, and the accompanying discharge from the ear is usually thin, ichorous, and frequently fœtid.

Within the mastoid cells such deposits are also frequent, and I am inclined to think that in some cases, at least, the disease begins first of all within the mastoid, and subsequently spreads to the middle ear. At a very early stage the bone becomes affected, and undergoes an amount of destruction which is almost inconceivable, considering the comparatively slight external indications present.

In some cases which have come under my observation practically the entire cancellous tissue of the mastoid—occasionally of both mastoids—has been eaten away, leaving merely a bony shell upon which the middle fossa is poised. Owing to this early and extensive destruction of bone, the facial nerve in part of its course is exposed, with resulting facial paralysis. In fact, early facial paralysis in a case in which sthenic symptoms have been absent should, I hold, always be looked upon with suspicion and as a probable manifestation of an underlying tuberculous lesion. Early implication and enlargement of the glandular structures around the ear is also a most important symptom, and when masses of enlarged glands occur around the ear any discharge from the tympanic cavity should be microscopically examined for bacilli.

To definitely establish the fact that the aural lesion is of a tuberculous nature the characteristic bacillus must be found. This may be an exceedingly difficult task, but in all cases it is worth while staining and examining the secretion from the middle ear.

Should no evidence of its presence be found in this way, small pieces of granulation tissue may be removed by forceps pressed between two cover-glasses and stained in a suitable manner. Occasionally bacilli will be found in such preparations. The method which I believe gives the most reliable results, however, is the inoculation of guinea-pigs with small fragments of tissue removed from the middle ear or adjoining mastoid cells, and I believe that it is advisable to inoculate with fragments of bone and mucous membrane removed from an area where the disease is seen to be advancing. In many such cases when the mastoid has been opened for the purposes of treatment, a pultaceous-looking mass will be found filling up the cavity, but this material is practically valueless for experimental purposes, consisting as it does of broken-down tissue, inspissated purulent debris, and epithelial cells. When, however, it has been removed by means of a spoon and the underlying bone exposed, it will be seen where the disease is making progress, and from where a scraping of bone should be taken. In my experiments I have inserted a fragment of tissue obtained as above described into a guinea-pig's hind-leg just about the knee-joint, all hair having previously been removed by singeing with a platinum knife. A small pocket is now made with a sterilized needle, and the tissue carefully inserted. In a few weeks' time, should the tissue inoculated be tuberculous, the inguinal glands will be found enlarged, and as time goes on the tuberculous

virus will be found to have spread over the animal's body, the glands and viscera being attacked in the following order, according to the results obtained by Professor Delépine :

During the second week after inoculation the lymphatic ganglia upon the same side of the body below the diaphragm and the spleen will be found enlarged.

During the third week, the liver, the mediastinal and the bronchial ganglia.

During the fourth week, the lungs, the cervical and the axillary ganglia.

After the fourth week some of the lymphatic ganglia of the opposite side of the body below the diaphragm become affected, but this takes place extremely slowly, and the sublumbar and popliteal glands escape for a considerable time.

Microscopic sections made from these glands, and stained for bacilli, will frequently be found to reveal their presence.

In this way a definite diagnosis of the actual character of the underlying lesion can be made, and the value of the knowledge thus obtained is naturally immense, both as regards prognosis and treatment.

The course of such tuberculous lesions is only too often a downward one, despite the most elaborate and painstaking treatment. The practical difficulties encountered in removing tuberculous deposits within bone are immense, and in no region of the body are these difficulties greater than when tubercle attacks the temporal bone, for reasons which must be obvious to all here.

The complications which have to be feared are : (1) meningitis, (2) tubercular enteritis, (3) general marasmus.

The treatment of such cases must be considered from two points of view, according as it is non-operative or operative. Cases will be met with, especially in infants, where any operative interference will from the first be seen to be hopeless.

Such are the cases where marked debility and emaciation are present, where advanced facial paralysis and masses of enlarged glands have been early symptoms, and where the discharge is abundant, foetid, and frequently blood-stained. In such cases palliative measures, antiseptic treatment, and, if possible, residence at the seaside, are indicated, but I am bound to say that in the majority of such patients whose cases I have followed an early death has been the usual history. The prognosis in such cases I believe to be essentially bad.

In other cases, however, where the present condition of the patient is good (and often enough it is so), and where the tuberculous lesion may be regarded as primary and local, much can be done by suitable operative interference. It is almost superfluous to say that the first and the main essential is to provide free drainage. This implies opening and cleansing the mastoid cells, and it is a remarkable fact how often in such cases, without any external and objective sign or indication, the mastoid cortex will be found extensively perforated, and a pultaceous mass immediately exposed to view. Under good illumination a very careful toilet of the part should be effected, and this can generally best be done by means of a sharp spoon. All softened and carious bone must be scraped away, and as smooth a cavity left as possible, even if this necessitates laying bare the dura and walls of the lateral sinus. The cavity thus obtained should be allowed to granulate from the bottom, and care must be taken to stimulate any sluggish area by means of applications of chloride of zinc, nitrate of silver, etc. Frequently more than one scraping is necessary as fresh foci of disease appear. In one particular case which came under my treatment some years ago, and where the cause was proved to have been feeding with milk from a tubercular cow, five separate operations had to be undertaken before the morbid process was eradicated, which, however, it finally was, and the child has now grown up a healthy and sturdy boy. In very many of the cases the middle ear has been so extensively destroyed that its function as an organ of sense may be disregarded. Under such circumstances its contents should be freely curetted, and middle ear, antrum, and mastoid cells thrown into one cavity, and allowed to become obliterated by means of healthy granulation tissue. Where, however, a fair degree of hearing is present, efforts should be made to preserve the function of the organ so far as is possible.

An important point arises in connection with the treatment of the accompanying enlarged glands. Some of the glands may be enlarged purely as the result of septic absorption, and if the morbid cause be removed this enlargement will gradually subside, especially if aided by suitable treatment. But many of the glands are of a tuberculous nature, and are prone to undergo caseous degeneration, while at the same time they are a source of possible systemic infection. Hence I hold that after the mastoid area and the cavity of the middle ear have been attended to, and as soon

as the condition of the patient admits of it, another operation should be undertaken with the object of removing these enlarged and tuberculous structures.

The facial paralysis which so often accompanies tuberculous disease of the middle ear is unfortunately usually permanent. Something may, however, be done by facial massage, and the internal administration of strychnia to assist in maintaining the tonus of the facial muscles.

General treatment, such as the exhibition of cod-liver-oil, iodide of iron, syrup of iodine, etc., is useful, as also are change of air and liberal diet. The general conclusions from a study of these cases may be summarized as follows :

1. That primary tuberculous disease in and around the middle ear is of fairly frequent occurrence, and that it most usually attacks the children of the poor, especially the poor of our larger cities.

2. That a generalized tuberculous infection may arise from a primary focus within or around the middle ear.

3. That the prognosis in such cases is not very favorable, at least 40 to 50 per cent. of the cases succumbing, even after operative treatment has been undertaken.

4. That in many of the cases operative interference is contra-indicated, owing to the extent of the existing disease and the asthenic condition of the patients.

5. That when operative interference is feasible, the main object should be to scrape away all available foci of disease and to provide efficient drainage.

6. That the best and the most reliable means of establishing the tuberculous nature of the disease is by means of properly conducted inoculation experiments.

Dr. ARTHUR HARTMANN (Berlin) read a paper on **congenital and acquired atresia of the meatus externus.**

Dr. Hartmann referred to previous reports on atresia auris congenita, which he considers should more correctly be regarded as absence of the external meatus.

He demonstrated two preparations with plaster casts of the rudimentary external ears of the same.

The first specimen was from a new-born infant, in which on both sides there was complete absence of the annulus tympanicus and membrana tympani, whilst the tympanic cavities and ossicles, though present, were not quite normally developed. In the

second specimen, from an adult, the external meatus—*i.e.*, the pars tympanica and membrana tympani—was completely wanting. The articular surface for the jaw was on the anterior surface of that portion of the temporal bone which normally forms the posterior wall of the meatus. In this case also the tympanic cavity, the ossicles, and the antrum mastoideum were somewhat abnormally developed.

These specimens were important in their bearing on the question of the operative establishment of an external auditory meatus in cases of atresia congenita. They showed that this was not possible.

It is well known that even with both meatuses absent, hearing and understanding of speech can exist.

Reports of complete acquired closure of the meatus were rarer than those of congenital absence of the meatus. Dr. Hartmann reported a case he had seen in which after diphtheritic-scarlatinal otitis the ossicles on both sides came away, and later complete bilateral bony occlusion of the meatus supervened.

Sufficient hearing-power remained to prevent the onset of deaf-mutism, loud speech being heard. On one side the meatus was restored by operation. After turning forward the auricle the new-formed bone was chiselled away, and the cavities of the middle ear laid bare, as in the radical operation. The meatus was covered by means of Körner's flaps. Healing was very slow. The hearing was considerably improved.

In the discussion which followed Dr. HOLINGER (Chicago) said that the paper was very interesting to him, because he was at present faced with the question whether to operate in such a case. In examining 510 children of the Institute for the Education of the Deaf and Dumb, in Jacksonville, he found a girl of fifteen with absence of both auditory canals. The girl was growing more and more deaf on account of constantly recurring attacks of otitis media. The first attack came on after scarlet fever, and the pus broke through the mastoid. The question of operation answered itself. He should operate in the following way. He should chisel behind the auricle down to the middle ear, and remove the malleus and incus. He should allow the wound to granulate and then cover, according to Siebenmann, with Thierch's grafts. Thus he should create a canal behind the ear. The operation would be to improve hearing and to stop the recurrence of the suppuration.

Dr. HARTMANN, closing the discussion on his paper, said : It is not advisable to operate on such cases as long as there is no inflammation. I do not believe that an operation according to Professor Siebenmann will improve the hearing-power. If there is recurrent inflammation, as in the case of Dr. Holinger, we may proceed as he advised.

Professor V. UCHERMANN (Christiania) read a paper on **rheumatic diseases of the ear**, which he sums up as follows :

1. Rheumatic fever is sometimes preceded, sometimes accompanied, by otalgia, alone or together with an acute swelling and injection of the drum and the adjacent bony meatus, followed by a serous or sero-fibrinous secretion of the middle ear (otalgia, myringitis, otitis externa, otitis media rheumatica), or it may be complicated during its progress with affections of the middle ear and the internal ear (labyrinth, perhaps the auditory nerve).

2. There are other more independent rheumatic ear diseases with persons of a rheumatic constitution or tendency (previous rheumatic fever, etc.). The ear affection appears as an otitis media serosa with yellowish, half-fibrinous exudate, or as a (secondary) sclerosis with progressive character.

3. The characteristics of the different forms are : In the *acute* forms—painfulness, excessive injection, and the tendency to the formation of fibrinous exudates. In the *chronic* forms—the tendency to the formation of fibrinous exudates, and the tendency to affect the bony capsule, with severe tinnitus and slow but steady progression. Salicylic acid seems to influence the acute forms but not the chronic. These latter, judging from the experience of a case at present under my treatment, are perhaps more influenced by a general rheumatic treatment.

In the discussion which followed Dr. HARTMANN said : The paper of Dr. Uchermann reminds me of one patient who probably comes in this line. A man slept one very cold and wet night in the woods ; when he awoke he found he had completely lost his hearing.

Dr. UCHERMANN, closing the discussion, said : It is possible that Dr. Hartmann's case comes in this line, but we will have to differentiate between acute catarrhal inflammation of the ear and rheumatic inflammation of the middle ear. One is easily amenable to treatment with salicylic acid, the other is not. Furthermore, in rheumatic cases we always find other manifestations of rheumatism ; exceptionally, rheumatic otitis shows infiltration and exudation in the ear alone.

Dr. T. BOBONE (San Remo) read a paper on **the early involution of adenoid growths on the Riviera.**

The paper was a contribution to the ætiology of adenoid growths. Dr. Bobone said he had for some time been struck by the fact that adenoids are excessively rare amongst the natives at San Remo. Moreover, he had observed that adenoids met with in patients coming to the Riviera, and for the removal of which the parents would not consent to an operation, slowly involuted; so that some months afterwards nasal respiration became possible, speech was much improved, the tendency to taking cold and to coughing with very slight provocation was lost, and the normal development of the child took place. Dr. Bobone is of the opinion that pure and simple involution of the adenoid growth, although not generally admitted, is possible; and this involution he attributes to the same cause as the scarcity of the vegetations amongst the natives. That cause, he says, must be looked for in the dryness of the climate and the clearness of the atmosphere on the Riviera. The other ætiological factors for adenoid vegetations mentioned by writers on the subject, such as geographical latitude, diatheses, discharge from the nose, infectious fevers, are also to be met with at San Remo, and notwithstanding this the adenoid vegetations, as already stated, are so rarely met with. Dr. Bobone believes the most important factor to be the humidity of the climate of the country, and that the greater the humidity the larger will be the number of children with adenoids. He has been able to demonstrate this fact by collating the geographical distribution of adenoids in Italy, and he gave a table showing that the frequency with which the cases are met with increases directly with the humidity of the climate of the different localities referred to.

Dr. Bobone is also of the opinion that a factor which frequently complicates a simple case of adenoids is inflammation-adenoiditis. In the localities where the vegetations are most frequently met with there also is a corresponding increase in the attacks of adenoiditis, favored as it is by the cold, fog, and the damp, whereas on the Riviera the warmth and dryness of the climate are unfavorable to the development of these attacks, and when the vegetations are not irritated by inflammation the involution can take place. Dr. Bobone added that in cases in which the parents would not consent to an operation the good results he had obtained by treatment he attributed more to the action of the climate than to other remedies.

Dr. RUDLOFF (Wiesbaden) read a paper on **the operation for the removal of adenoid growths with the head hanging over the table, while the patient is under the influence of chloroform.**

In his opening remarks Dr. Rudloff drew attention to the method of performing operations on the hanging head, in cases in which there is danger of blood suction. He then described his method, of which he had made use during the last eleven years. His experience included over seven hundred cases. He advocated the free administration of chloroform, and employed Boeckler's and Hartmann's curette in performing the operation. In describing the method of operating he drew attention to the following points :

I. Adenoid growths occasionally have their origin in Rosenmüller's fossæ. In removing them it is important (*a*) to avoid injury to the pharyngeal orifice of the Eustachian tube ; (*b*) to bear in mind that the tissue surrounding the carotid artery extends into the lateral wall of the fossa, and that danger of injury to this artery is to be guarded against. How necessary this warning is, is proved by the case recorded by Schmiegelow.

II. Adenoid growths must be thoroughly removed (*a*) in order to avert as far as possible the danger of recurrence ; (*b*) because a certain percentage of the cases which occur are tuberculous.

III. If the tonsils are enlarged it is advisable to remove them some time previously.

Dr. Rudloff illustrated his method by means of a specimen (sagittal section through the head), and exhibited the instruments he employed. He further showed casts illustrating the varying dimensions of Rosenmüller's fossæ and the relation existing between these fossæ and the orifices of the Eustachian tubes, and referred to a specimen showing the relation between the carotid artery and the lateral wall of Rosenmüller's fossæ, which was exhibited in the congress museum. His statistics recorded a recurrence of three and a half per cent. In concluding he remarked that he did not necessarily confine himself to the method he had described, but adapted it to the individual requirements of the cases which came under his care.

DUNDAS GRANT, M.A., M.D., F.R.C.S., read a paper on **diminished bone-conduction as a contra-indication for ossiculectomy.**¹

¹ Contribution to the Proceedings of the International Otological Congress in London, August, 1899.

With very few exceptions, all authorities in otology are agreed that under certain circumstances, namely, as the result of adhesions arising from purulent or non-purulent inflammatory changes, the malleus, incus, and membrana tympani, whether whole or incomplete, are useless and even prejudicial for the transmission of sonorous vibrations to the stapes, and under such circumstances the question of their removal may be usefully considered, quite apart from the major operations required for the saving of life, and, indeed, the performance of ossiculectomy becomes a duty.

If the outer ossicles are fixed, and hamper the movements of a presumably or possibly mobile stapes, their removal is indicated on account of the hearing-power, apart from other and even weightier considerations. Of course, we must not remove ossicles if our so doing is at all likely to make the hearing worse—that is to say, if these ossicles are of functional value. How are we to decide on this point? According to Politzer, hearing for the whisper at the distance of 1 metre is a very strong contra-indication against ossiculectomy. If the deafness is entirely or to a great extent due to concomitant disease of the internal ear or auditory nerve, it is obvious that the results, *quâ* hearing, obtainable from ossiculectomy can be of little or no value. Diminished bone-conduction is therefore a contra-indication. In suppurative cases it suggests a labyrinthine complication, and, it may be, a tuberculous affection of the petrous bone, as without this the tendency is for the tympanic changes to bring about an increase of conduction through the bones.

Two cases are reported to illustrate some improvement of hearing by ossiculectomy though bone-conduction had been diminished.

Summary. The presence of the ossicles may interfere with the hearing-power in post-suppurative cases in the following ways :

1. By being fixed themselves, and thereby making the stapes immobile.
2. By favoring the accumulation and retention of desquamative and exudative products which impede the movements of the stapes.
3. By preventing the application of a cotton-wool drum to the stapes.

Their removal is under these circumstances justifiable and desirable, if the hearing-power is less than for the whispered voice at 1 metre and the bone-conduction is good.

Even if the bone-conduction is diminished to some extent, a slight

improvement in hearing may follow the operation of ossiculectomy. A very slight improvement in hearing may make the difference to the patient of being able to follow his employment.

Therefore, when hearing is so bad that the patient is unable to follow his employment, it is justifiable to remove the outer ossicles and remains of the membrane, even though there is some diminution of bone-conduction.

Dr. ALLAN T. HAIGHT (Chicago) read a paper on **naso-pharyngeal adenoids as a causative factor in ear diseases.**

The general belief that adenoid vegetations were never present after the thirtieth year was contradicted by Couetoux, of Nantes, who operated upon a man of sixty-five to cure a marked unilateral deafness. Dr. Haight had found vegetations in ages above sixty, and frequently between thirty and forty. They did not differ histologically from adenoids in children.

As to treatment, he should say it was never too early nor was it ever too late. At the first recognition of existing growths the operation should be performed at once. He had found that curetting was the only true basis of treatment. He was not a believer in general anæsthetics in children over the age of twelve, as local anæsthesia after twelve made such an operation absolutely free from danger; but there were some cases where a general anæsthetic must be administered, especially in refractory children and nervous adults. In children it was advisable to anæsthetize in a sitting posture, and he preferred bromide of ethyl to any other of the numerous anæsthetics.

Professor KNAPP advocated the use of ether in children as in adults. There was no danger, for only an initial anæsthesia was needed.

Dr. EEMAN (Ghent), Professor GRAZZI, and Dr. GRADENIGO also joined in the discussion.

Wednesday, Aug. 9th.

MORNING SESSION.

The subject for general discussion, **the indications for opening the mastoid in chronic suppuration of the middle ear**, was opened by Professor POLITZER (Vienna), Professor MACEWEN (Glasgow), Dr. LUC (Paris), and Professor KNAPP (New York).

PROFESSOR POLITZER said it was a happy idea of the Organization Committee to have put on the programme a discussion on

such an important question. There is no question of otology which had acquired more actual interest than the free opening of the middle-ear spaces for chronic suppuration of the middle ear. Experience had shown that the free opening of the middle-ear spaces is of the most vital importance, by which we are able to save the life of the patient and prevent other consequences to the middle ear hurtful to the organism. The indications are generally acknowledged, and in most cases with well-marked symptoms the surgeons were likely to be in perfect agreement; therefore there could be but little new to say in reference to the indications. The chief point in that discussion would be to decide whether it is justifiable without well-marked symptoms to operate as frequently as some operators maintained. Professor Politzer enumerated then all the indications for the so-called "radical operation," giving after his own experience a complete critical view on the subject, the details of which will be published in the *Transactions of the London Otological Congress*. He concluded that experience taught him that not rarely the clinical symptoms did not correspond to the pathological changes found during the operation in the temporal bone. Sometimes only insignificant changes, such as a small quantity of granulation tissue in the attic or antrum, were found in cases where he had performed the operation on account of dangerous symptoms. On the other hand, he found grave changes where before the operation he would not have expected them.

These circumstances render it more difficult to draw strict lines in regard to the indications, and there would always be cases in which some surgeons, on account of the impossibility of predicting exactly the pathological changes in the temporal bone, would hold that it was not advisable to wait for the appearance of well-marked symptoms, but to operate at once, while others would advocate more conservative methods. That many cases of chronic suppuration of the middle ear could be healed by vigorous antiseptic treatment after removing granulations or cholesteatoma in the tympanic cavity and the attic and partially removing the wall of the attic, had been shown by the daily experience of those surgeons who treated such cases by conservative methods. Although he is a strong advocate of the radical operation in suitable cases, he could not agree with those surgeons who performed it often for the mere purpose of the discharge—at least, until strenuous efforts had been made to stop it by other means. He thought that in

these cases it is not justifiable to have recourse to an operation which, although not necessarily dangerous in the hands of a skilled operator, is still a serious one, especially when we consider (1) the many important structures in the vicinity which might be injured, (2) the possible permanent impairment of hearing in those who before the operation could hear fairly well, (3) the protracted healing process after the operation, which very often render the patient *hors de combat* for many months. It is his firm belief that these views would in course of time receive general assent, when further anatomical researches and more extended clinical observations had cleared up those points about which at present their judgment is still in doubt.

Professor WILLIAM MACEWEN (Glasgow) said: Mr. President and Gentlemen,—I have to thank you for the honor you have conferred upon me by asking me to open a discussion on the indications for opening the mastoid in suppurative otitis media.

Instead of enumerating the individual indications for opening the mastoid, which may be found in more or less detail in most recent otological works, and which may require to be supplemented or reduced as our experience ripens, it is thought desirable to regard the subject from a broader basis, and one which may be found more generally applicable. The following forms a useful practical rule:

When a pyogenic lesion exists in the middle ear, or in its adnexa, which is either not accessible or which cannot be effectually eradicated through the external ear, the mastoid antrum and cells ought to be opened.

As there are many ways of opening the mastoid, some more and many less complete, the observations made in this note cannot be equally applicable to all of them.

Some operators content themselves in opening the mastoid by sinking a narrow shaft into the antrum, through which they can inject fluid, and others perform a typical operation irrespective of the pathological condition revealed.

The speaker does not follow the classical operations of Kuester, Stacke, or Schwartze, but operates by first opening the mastoid at the base of the suprameatal triangle. From that point he follows the pathological lesions anteriorly into the middle ear, especially exposing and carefully scrutinizing in all cases the attic of the antrum and tympanum, when, if found eroded, these plates are removed, along with the morbid contents of the middle ear. We

then pass backwards and downwards, through the mastoid cells toward the sigmoid sinus, following the pyogenic erosions wherever they may lead in that direction, and when necessary exposing the knee of the sigmoid sinus. After opening the mastoid antrum and cells, the further procedure has a purely pathological basis ; if the disease revealed be extensive, so must be the operation. The greater part of this operative procedure is performed by means of the rotatory burr, which is the safest instrument for such a purpose. One of the first objects of the operation is to secure the patient against subsequent pyogenic extension to the brain on the one hand, and the cerebellum and sinus on the other ; and this may be done with a probable certainty, as far as the two most frequent localities for brain and sigmoid sinus invasion are concerned. It is to such an operation (with its pathological basis) for "opening the mastoid" that the following remarks apply :

The ablation of the mastoid, while at once eradicating a suppurative process, chiefly located in the mastoid antrum and cells, affords at the same time ready access to the attic and inner wall of the tympanic cavity, and to the auricular extremity of the Eustachian tube. Immediately following the operation, one can initiate the formation of a vascular tissue, and thus create an efficient barrier against pyogenic extension to the otherwise most accessible and most vulnerable parts of the brain, the cerebellum and the sigmoid sinus.

In persistent otitis media purulenta, the mastoid operation has at least three advantages over that of the treatment by way of the external auditory meatus : First, by exposing to ocular inspection all the affected area, thus enabling the operator to follow and eradicate all the recesses in the bone made by pyogenic invasion. In this way one does not act in the dark, as the whole pathological field is open to inspection. Secondly, by being able to secure asepsis. Thirdly, by raising an efficient barrier against pyogenic extension between the most vulnerable parts of the brain and the sinus.

INDICATIONS FOR OPENING THE MASTOID IN PURULENT OTITIS MEDIA.

1. There are many cases of purulent discharge of the middle ear, of such long standing, and so intractable to all remedies administrable through the external auditory meatus, that most surgeons would agree that in such the mastoid ought to be opened.

When the symptoms are obtrusive, the pain severe, the discomfort great, the discharge profuse, and possibly foul-smelling, the patients themselves will probably demand relief, which the otologist will readily grant. It is not, however, to such pronounced cases that special attention is here directed. It is rather to those in which the decision is much more difficult, especially in the presence of very slight discharge, continuous, though apparently subdued by treatment. Many believe that very slight though persistent otorrhœa can lead to no untoward result, the patient living a considerable number of years, possibly even a long life, with the discharge never properly away, and yet not sufficient to arrest attention. Its long duration causes the bearer of it to pay little attention to it, and by-and-by it may be disregarded, and even forgotten.

The pyogenic process may, however, proceed inwards, giving rise to symptoms often misunderstood or attributed to other causes, and may eventually either prove fatal or, by undermining the constitution, thereby pave the way for the advent of other lesions. Many patients thus affected, though able to pursue their usual avocations, are yet subject to periods of malaise, with occasional recurrent slight febrile attacks, irritability, and nervous hypersensitiveness, exhibited in unevenness and irascibility of temper, which attacks last from a few days to a week or more, leaving the patient slightly weaker, though relieved from the depression, and fit to enjoy life. These attacks are so frequent, and the patient becomes so used to them, that he comes to regard them as part of his ordinary habit, and often attributes them, with considerable plausibility, and sometimes with point, to colds, chills, biliousness, indigestion, etc.

When they occur, however, in the presence of pyogenic otorrhœa of old standing, they may bear a different interpretation, and in the absence of other definitely assignable causes they may be considered as the result of slight absorptions. In some cases the cause and effect are a little more evident, as when patients have pyogenic pulmonary catarrh with organisms in the lung secretion similar to that found in the slight purulent otitis media, and when these pulmonary attacks are mainly coincident with the recrudescence of the otorrhœa. In some such slight cases, after every other assignable cause was exhausted, and after treatment in other directions had failed, the mastoid was opened, when, in the midst of eburnation and sclerosis of the bone, marked osseous erosions,

containing small quantities of secretion filled with pyogenic organisms, were found, and generally these led more or less directly to the sigmoid sinus, the coats of which bore evidence of long-standing irritation, and through which, no doubt, the pyogenic absorptions had taken place.

After the operation these patients became greatly improved in health, all their old general symptoms having disappeared, along with the cessation of the otorrhœa.

Cases with a history of an initial period somewhat similar to the above have been seen at a later stage by the author, coming under observation in a moribund condition from pneumonia, due to septic infections from thrombosis of the sigmoid sinus, originating in a purulent otitis media of old standing; the passage between the cells and the sigmoid sinus being in some instances very small and tortuous, and not unlike those apertures seen in the cases with slight symptoms just referred to.

When it is recollected that in many instances the otitis media purulenta is obscure and overlooked, and that the symptoms of the purulent absorption may be of a "typhoid" as well as of a "pulmonary" type, one can easily understand that death may be attributed to pneumonia or to enteric fever.

It is quite true that with chronic otitis media purulenta a fatal issue ensues only in a limited number of cases, a proportion, however, perhaps greater than is generally believed, but as one cannot, with any data obtainable at present, foretell which of these apparently slightly affected patients are to become the victims of a fatal issue, ordinary prudence dictates its removal even while it is slight.

It cannot be too often recalled that the virulence of the otorrhœa cannot be measured by the quantity of the secretion, its odor, or the slowness of its initial symptoms, and that the pyogenic process may proceed insidiously until some slight exciting cause or accidental circumstance precipitates a dangerous or fatal crisis.

2. Another question arises, whether there be lesions in the middle ear, which, though it may be mechanically possible to remove them through the external auditory meatus, could yet be removed with greater safety through the mastoid. This must be answered affirmatively, while the middle ear and its adnexa are in a septic condition, and when by application through the external auditory meatus they cannot be made aseptic prior to

the performance of an operation entailing the exposure of a fresh surface to the action of pyogenic organisms and their products. To operate through the external ear under such conditions is to court disaster. By opening the mastoid one can efficiently remove therefrom the suppuration, and can eradicate its cause, after which any operation involving exposure of a fresh surface can be proceeded with in safety.

In numerous instances, cases of intracranial pyogenic extension have occurred in immediate sequence to the removal by way of the external auditory meatus of granulation tissue masses—so-called “aural polypi”—which were protruding into the middle ear. Some of these granulation masses protrude through the bone from the dura mater, which they serve to protect, *as long as they remain intact*, but when they are removed a fresh surface with open mouths of vessels is exposed, and absorption through the softened brain membranes is apt to occur.

Besides rendering the operation safe by asepsis, the opening through the mastoid enables one to demonstrate the exact locality from which these granulation masses spring. This is difficult and sometimes impossible to do, by operating through the external auditory meatus. One must recollect that many of these granulation masses, presenting at the upper and back part of the middle ear, protrude through eroded bone, and that their presence is to be regarded as indicative of a diseased process which has attacked the osseous tissues as well as the soft parts; and therefore to an extent these granulation masses are symptomatic, and by removing them alone the disease is not removed, but only *one* of its indications.

As long as these masses are left *intact*, they may secrete, but they do not readily absorb, as they are destitute of lymphatics, and, therefore, in the midst of certain pyogenic organisms, not only may the granulation masses be left with safety, but they afford for the tissues from which they spring a definite protection from the invasion of certain pyogenic organisms. They are a provision thrown out by Nature in an attempt at repair.

In the presence of such granulation masses, one does not devise an operation merely for their removal, but for the eradication of the disease which has occasioned them. In removing them one has also to make provision that absorption will not take place through the wounded surface left thereby.

3. In many, if not all, of these persistent pyogenic otorrhœas,

the osseous tissue is involved, and it is very difficult, by means of treatment through the external auditory meatus, to eradicate the organisms that have housed themselves in the recesses of a minute particle of necrotic bone. In the interior of such harbors of refuge, situated in the mastoid, the pyogenic and other organisms are safe from any antiseptic wave or blast introduced through the external ear, and wait—and they have endless patience, even beyond that of the aurist—until the antiseptic has exhausted its energies, when they again sally forth, in the tide of a catarrhal effusion, disseminating themselves and affecting fresh areas. Erosion often steadily progresses within the mastoid cells, even when the middle ear has been rendered sweet. In such cases the surgeon would be deceived were he forming an opinion on the asepticity of the mastoid cells from the condition of the discharge issuing through an external ear which he has rendered aseptic by chemicals, as a slight pyogenic discharge issuing through such chemicals would probably be rendered aseptic in transit.

In other parts of the body, where a necrotic bone filled with pyogenic organisms is even exposed to view and of easy access, it is with the greatest difficulty, and sometimes it is impossible, to entirely destroy these organisms by direct applications of antiseptics of such strengths as the neighboring tissues would withstand without themselves being destroyed. If this be so under such conditions, how much more difficult must it be by way of the external ear to eradicate pyogenic organisms through hidden, narrow, tortuous, and sometimes almost inaccessible passages which are often found in the mastoid process and cells.

4. In recurrent cases of purulent otitis media, one cannot pronounce the patient safe even when the otorrhœa ceases—temporarily.

In one such instance, treated through the middle ear on the most approved principles, with great care, by an aurist of undoubted ability and experience, the patient, who had had a slight pyogenic otorrhœa, was pronounced cured by the aurist, the discharge having disappeared, and the condition of the middle ear appearing to him in every way satisfactory. Within about three weeks of this time the patient came under my observation, suffering from pronounced symptoms of cerebellar abscess, and was plunged in profound coma, accompanied with great respiratory difficulty. He was operated on, two ounces of pus being removed from the cerebellum, after which he made a rapid recovery.

The middle ear contained only a few drops of pus, the mastoid, antrum, and cells contained more, and an erosion in the mastoid exposed the sigmoid sinus, which was thickened, the disease having spread to the cerebellum by continuity of tissue.

With the data at the disposal of the aurist in this case it would have been difficult for him to have acted otherwise than as he did, and had he done so it would have been at variance with the teaching of the day. This case, however, demonstrates that the information obtainable by inspection of the middle ear is not sufficient to reveal the pyogenic invasion of the recesses of the mastoid region.

Had the case been treated by opening the mastoid in the way described, the formation of the abscess in the cerebellum would have been prevented.

5. Cholesteatoma and tubercular processes with secondary pyogenic involvement are also conditions for which the mastoid requires to be opened, and it is only in this way that these diseases can be efficiently removed.

6. The problems connected with the question of operation upon recurrent attacks of purulent otorrhœa are somewhat similar to those which arise in connection with appendicitis. Purulent otitis media and appendicitis have many analogies. They are both pyogenic, but while the latter is the result of the action of a well-known bacillus, whose course is definite, the former may be the result of one or other of a variety of organisms of greater or less virulency, and producing different pathological effects. Both are apt to invade neighboring structures, the one the peritoneum, the other the intracranial tissues. Both are insidious in their action, and as long as they exist they are apt to undermine the health and reduce the vigor of the individual. Both tend to precipitate a sudden serious illness, and one which is often fatal. In both an early and complete operation not only at once relieves the patient from the depressing effects of the disease, but at once removes the possibility of a sudden and fatal termination. In both, many, lulled into a sense of security by the apparent passivity of the disease and its long duration, and arguing from the fact that as the patients have recovered from one attack they are equally likely to recover from another, postpone operation until the peritoneum in the one case and the brain in the other become involved, and a fatal termination is imminent, but then it may be too late to save the patient.

7. With regard to the fauna occurring in that perfect incubating chamber, the middle ear and its adnexa, and their relative pathological significance, the time at our disposal prevents our dwelling at present further than to state that valuable indication may be derived from the identification of the particular form or forms of organisms which may be present in such cases.

8. After what the author has elsewhere written, he presumes that it may be understood that the opening of the mastoid must always be undertaken as a preliminary step to operating upon those intracranial lesions originating in purulent otitis media—abscess of the brain or cerebellum and sigmoid sinus thrombosis. To operate upon the several complications, and to leave uneradicated the paths by which pyogenic organisms enter, is to render the patient's recovery doubtful, and to expose him to fresh attacks.

9. Syme is credited with saying that diseases of the ear were of two kinds: the one which is curable, and is treated by the surgeon; the other which is incurable, and is treated by the aurist. Whatever be the special province of the present-day aurist or surgeon, let us hope that we relegate to neither many cases of incurable disease. The anatomy and pathology of the mastoid region were not understood in Syme's day, and the operation of opening the mastoid in its present conception was unknown. As the subject which you, Mr. President, have arranged for this discussion is the indications for opening the mastoid in purulent otitis media, we are precluded from entering into the consideration of the results attending that operation. The personal experience of the author leads him, however, to state that he regards the operation of opening the mastoid as the safest and most efficient way of eradicating otherwise persistent purulent otitis media. In conclusion, he adds that the more the pathology of purulent otitis media is studied, the more frequently the complete ablation of the mastoid recesses is undertaken, the fewer will become the so-called "incurable" cases of ear disease. He regards the operation of opening the mastoid as substantially contributing to the well-being of human comfort and happiness, and in materially lengthening life.

Dr. Luc (Paris) described the indications for opening the mastoid in chronic purulent otitis under the three following headings:

1. *In case of retention of pus.*—The symptoms may occur suddenly in the course of a chronic otorrhœa and resemble those of an acute suppuration. Pus is retained in the antrum by

exuberant granulations in the middle ear, and especially about the aditus; the patient, for the first time, experiences pain in the ear, usually referred to the base of the mastoid process, is feverish, and the general health is disturbed.

Palpation of the mastoid reveals tenderness to pressure near the base, varying according to the depth of the antrum. Operative intervention is indicated unless removal of granulations or polypi is sufficient to re-establish the drainage of pus and to alleviate the other symptoms. Pain is the one symptom which, if severe enough to prevent sleep, should induce us to operate. To wait in such an instance for the onset of other symptoms is to expose the patient to intracranial extension.

To these symptoms the more manifest signs of pus retention in the mastoid are frequently joined, namely, swelling, oedema, and redness of the skin. In regard to the extent of the operation necessary in these chronic cases, all of the cavities of the ear should be exposed and cleaned out, whether we proceed from the antrum to the attic (Zaufal) or in the reverse direction (Stacke).

2. *With a view to the radical cure of chronic otorrhœa.*—I think that you will agree to the correctness of the statement that every suppurating focus, however obstinate it may have been, does not resist surgical treatment if the entire suppurating surfaces have been exposed, cleaned, and drained. The anatomical relations of the antrum and attic explain the frequency with which they are affected in all cases of chronic otorrhœa, and the tendency they have of keeping up the suppurating process, as well as their inaccessibility to treatment through the natural passages. Stacke arrived at the following conclusions, to which my own experience has also led me, and upon which I desire to lay great stress: the mastoid antrum, a true posterior elongation of the attic, participates in the great majority of the cases in the suppurative process of the latter, and consequently should be simultaneously exposed and cleaned as soon as local treatment, applied for a sufficiently long time, has failed.

Clinically, chronic otorrhœa of antral origin presents itself under two forms according as there is fistula or not. The fistula is normally on the external surface of the mastoid, though it may be situated farther back or near the tip. More rarely it traverses the posterior wall of the auditory canal, or the perforation may have taken place at the inner wall of the process and led to the various pictures of a Bezold perforation.

In the cases where there is no fistula, the diagnosis is often difficult, and the term *latent mastoiditis* is appropriate for this class. The drum membrane is found perforated. The perforations may be generally classified in three distinct types :

(1) Perforation in Shrapnell's membrane just above the short process of the hammer.

(2) The circum-malleal perforation. The defect is almost total except for a remnant of the *Mt* about the handle of the malleus. Granulations occupy the posterior part, about the aditus, and with Hartmann's canula grumous and fetid pus can be syringed out of the region of the antrum.

(3) The postero-superior perforation, small in size, near the aditus. Small polypoid masses may present through this opening, invariably recurring after removal, and the irrigations give the same result as in the preceding cases. In all of these types of perforation, small, white, mother-of-pearl collections may be observed which are cholesteatomatous masses from the attico-antral region. In all of these cases, the focus is probably in the region of the attic or antrum, but this does not necessarily, according to my judgment, indicate the opening of the mastoid process and the attic. Local treatment with Hartmann's canula should first be tried ; if unsuccessful, the removal of the ossicles, especially in case of a Shrapnell perforation or where the ossicles are visibly diseased, should be accompanied by a thorough curettage of the walls. If the suppuration persists after several weeks of careful treatment, with return of granulations, and irrigations continue to bring forth fetid pus or cheesy particles, delay is no longer permissible, and the radical attico-mastoidotomy should be done.

3. *In case of threatening intracranial complications.*—In this class our intervention is urgently demanded by the real danger of a beginning meningo-encephalic infection. I should first say a word about facial paralysis occurring in the course of a chronic purulent otitis. It marks a progression in the destructive work of the process, and it is not infrequently followed by signs of intracranial infection. Hence the onset of a facial hemiplegia is a grave complication and demands prompt operative intervention, especially when other signs present make the operation justifiable.

The urgency for opening the mastoid becomes absolute if in the course of an intractable otorrhœa any sign of beginning intracranial infection appears, with or without retention of pus. It is

unnecessary to enter here into a description of the symptoms of intracranial infection. In the presence of certain symptoms called focal symptoms, it is best, as is now generally accepted, to first expose the cavities of the middle ear and then proceed guided by the symptoms and the conditions found at operation. Before arriving at the stage of confirmed intracranial infection the patient often passes through a premonitory phase which it is, of course, of great importance to recognize. In these symptoms we place first, headache, different in character, sometimes accompanied by photophobia, and the countenance appears contracted; vertigo often with nausea; bilious vomiting, like in confirmed meningitis; inequality of the pupils may be present, and fever. Under such circumstances the radical exposure of the middle-ear cavities should be extended up to the dura. The dura has usually been exposed by the morbid process in cases with meningitic manifestations. It is, however, our firm belief that at the first operation the dura should not be opened, for we have all seen meningeal irritative symptoms disappear after a simple extradural disinfection, and it is well known how the post-operative prognosis varies according as the dura has been opened or not. If after twenty-four hours the symptoms persist or are aggravated, the dura is then to be opened, behind which, often on the surface of the pia or at a slight depth in the brain, the sought-after focus is found.

CONCLUSIONS.

A. The opening of the mastoid is indicated in the course of a chronic otorrhœa for three distinct purposes :

- 1st. To give vent to the pus in case of purulent retention.
- 2d. To counteract menacing or initial signs of intracranial infection of aural origin.
- 3d. To cure the otorrhœa when local treatment and removal of the ossicles with curettage of the granulations have been without avail.

B. The operation is only urgent in the first two cases.

C. In all cases of chronic otorrhœa, the bony opening must extend from the antrum to the attic, or *vice versa*, and be followed by curetting and disinfecting of all the cavities of the middle ear.

D. In case of threatening intracranial complication, the bony opening must be extended to the suspected region of the dura mater, though the latter is not to be opened unless at a subsequent operation, if, after as short a period of watching as possible, the threatening signs are seen to persist or to increase.

Professor H. KNAPP (New York) said, in part, that we want not only to be informed that under certain conditions, which his predecessors had so exhaustively and authoritatively dealt with, the mastoid should be opened, but also when, how, and where, and, in particular, how extensively, it should be opened, the description of the mere technique or the operation, however, lying outside the question. When acute purulent otitis media was on the border-line of becoming chronic, or had just become chronic, opening of the mastoid was indicated both as a curative and prophylactic measure. The indication for opening the mastoid was strengthened if tuberculosis, diabetes, syphilis, or some other constitutional disease were present, especially in the case of children. He thought the frequency of relapses in children was owing to the structural conditions of the infantile mastoid. He mentioned a case which had come under his own observation, to show that the suppuration may leave the tympanic cavity, attic, and antrum, but extend into and beyond the tip of the mastoid. The pus cells in this case travelled through the condensed bones in passages so small that they could not be followed with the naked eye. The indications for operation in advanced cases of destructive subacute and chronic mastoiditis were absolute, and, in the relapses of suppurative mastoiditis, almost absolute. The prognosis in both cases was favorable. He had seen children recover who had a whole mastoid and a good deal of the adjacent temporal bone converted into gelatinous masses, and the dura extensively covered with soft, discolored granulations. The best treatment of cases which from the beginning showed a disposition to long duration was to perform the first opening of the mastoid, and conduct the subsequent local and constitutional treatment with the utmost care and perseverance, so as to prevent the affection from becoming chronic. As particular requirements in such cases, he should lay stress on (1) a large, deep, and angular incision of the drum-head and the adjacent part of the posterior wall of the ear canal as soon as there was bulging, (2) opening the mastoid and thorough removal of all diseased tissue, (3) enlarging the antral canal by cautious scooping, (4) watching the course of recovery, using dry treatment rather than syringing. In chronic suppurative otitis media without symptoms of mastoid involvement that had resisted topical treatment and intratympanic operations, attico-antrectomy was indicated. In many cases it was difficult to determine when this should be done. During

past years intratympanic operations had steadily lost ground. Many aural surgeons reported good results from the removal of the ossicles and cleansing the attic in cases of chronic otorrhœa with or without cerebral symptoms. But, unfortunately, the good results in most of them had not proved permanent. He alluded to a patient who had long been treated by intratympanic procedures, but received only temporary relief. Such cases had determined him not to lose much time with intratympanic operations although he would not go so far as an excellent otologist who told him that he had abandoned them altogether.

If the outer wall of the mastoid were perforated, and an abscess or a fistula present, it was indicated to evacuate the abscess and seek the perforation, and, guided by it and the fistula, open the mastoid freely and remove all morbid material. That was better than to let the patient take the uncertain chances of a spontaneous recovery, which was rarely complete and permanent.

If the disease extended beyond the mastoid process, the radical tympano-mastoid operation had to be followed by operations on the affected parts outside the ear.

If in chronic purulent otitis media the anterior wall of the mastoid bulges—which meant a suppuration in the cells adjacent to the posterior wall of the ear canal—a free incision down to the bone was indicated. We should then explore the wall with a probe, or, if the skin were swollen and painful, wait a few days to see whether the mastoid should be opened from the outer surface or from the anterior.

If the pus extended from the ear into the pharynx, forming a retropharyngeal abscess, he would open the mastoid and expose the tympanic cavity and attic clear to the tympanic orifice of tube, and free it as far as possible from pus and disintegrated tissue.

The extension of the disease to the posterior cranial fossa was so important and so frequent that the removal of the posterior wall, in particular that part of it which formed the sulcus of the sigmoid sinus, had been recommended and practised by some competent aurists in all cases. If the posterior wall showed no flaw at the closest search, and the suppuration was limited, he had left the wall alone; but when the contents of the mastoid had undergone extensive molecular disintegration, he considered the exploratory exposure of the sigmoid sinus and dura mater correct practice. Similar indications resulted from the extension of the

suppuration into the middle cranial fossa, an occurrence less frequent than its extension into the posterior fossa.

Extension of the suppuration in the petrous bone might indicate opening of the mastoid as an initial step for removing carious and necrosed portions of the petrous, or evacuate pus which had passed from the middle ear through the petrous bone into the posterior cranial fossa, producing an epidural abscess on the posterior surface of the petrous pyramid.

Meningitis in the first stage might be recovered from by the opening of the mastoid and the posterior and middle cranial fossæ, exposing boldly the posterior surface of the petrous and liberating the pus.

Necrosis of the different portions of the temporal bone indicated the opening of the mastoid in most cases.

It was evident, Professor Knapp said, in conclusion, that the opening of the mastoid in its recent development by the combined efforts of general and aural surgeons took rank amongst the most important operations.

Before the discussion Professor LUCAE (Berlin) read a paper on **the radical operation in chronic suppurative inflammation of the middle ear.**

"At the outset I cannot sufficiently express my high estimation of the operation in question as a means of cure in chronic suppuration of the middle ear, by means of which alone I have seen recovery brought about in a large number of cases. The following observations are intended to serve the purpose of diminishing the abuse of the operation as much as possible.

"In the University Aural Clinic in Berlin under my direction there have been from April, 1881 (date of the foundation of the stationary clinic), up to August, 1899, 1935 *operations for the opening of the mastoid process*, of which 852 were for acute, and 1083 for chronic, forms of suppuration.

"It is obvious that in only a fraction of the chronic cases in which operation was performed was the operation such as is known as the 'radical' one (opening of all the cavities of the middle ear), this having only come into general use within recent years.

"The treatment by means of irrigation with a formalin lotion, 15-20 drops to 1 litre (quart) of boiling water, has been adopted since 1895. This had a double advantage, because I was able to cure without operation the larger number of cases, or at least to improve them, and further that, if the remedy produced no

good result, the indication for operation was all the more distinctly marked."

Professor GUYE (Amsterdam) said the mastoid operation was a very great boon to the patient and to humanity in general, as Professor Macewen had so well said, but, nevertheless, as to finding the indication for mastoid operations only in discharge which did not give rise to dangerous symptoms he could not agree. He considered that the important thing in a case of chronic otorrhœa was to keep the meatus as clean as possible, the using of carb. glyc., and, thirdly, to have great care for the keeping open of the Eustachian tube.

Dr. MOURE (Bordeaux): "I am quite of the same opinion as the openers of the discussion, who do not hesitate to open the mastoid whenever a discharge from the ear resists medical treatment, followed or not by the extraction of the ossicles, when this treatment has been properly carried out. It is certain, however, that surgical treatment ought to be limited to some otorrhœas, and not practised in all, as seem to think the partisans of surgical treatment *à outrance*. When a purulent otorrhœa is accompanied by local pain; when irrigation directed towards the attic washes out cheesy matter, or, still more, mother-of-pearl pellicles; when the otorrhœa continues to be fetid, in spite of regular irrigation; when, finally, we see the granulations recurring, in spite of ablation or cauterization, still more if there are spots of caries towards the superior or posterior parts of the meatus—in all these cases we must not hesitate to interfere surgically. Moreover, it may be said that all those that have had occasion to perform a certain number of operations of this kind have a tendency the more they operate to be more and more ready to operate. They recognize the necessity for operating, as also the efficacy of surgical treatment, which alone affords the means of curing certain otorrhœas that are intractable under ordinary treatment."

Dr. McBRIDE (Edinburgh) joined views with Professor Politzer, Professor Lucae, and Professor Guye in their conservative methods with regard to mastoid operations. Professor Macewen had laid down that a persistent otorrhœa in itself was an indication for mastoid operation. Under certain circumstances it might be so, but by no means generally. The question came to be, What could they promise to their patients from a mastoid operation? In chronic cases they could promise the patient nothing. A certain proportion did not do well after the operation, the discharge

remained, and the patient was exactly where he was before. But he agreed with Dr. Knapp that they did not do quite enough operations in acute cases just beginning to become chronic. Here the discharge usually ceased, the membrane healed, and hearing was restored after draining through the mastoid.

Dr. JANSEN (Berlin) was prepared to endorse the statement of Professor Macewen, that frequently disease of the mastoid process did not show itself by outward signs. The question with regard to operative treatment is easier if, instead of making the diagnosis simply of suppuration of the middle ear, we ascertain beforehand which region of the middle ear is affected. Cases of suppuration in the lower section of the tympanum lie outside our question, but, nevertheless, it is only with great difficulty that we effect a cure if the disease is located in the large recess between the fenestra rotunda and the facial. Further, the rare form limited to the attic was also to be excluded from consideration, as it did not require to be exposed through the mastoid process. On the other hand, the complication of abscess in the tube, which was very rare, called for an opening through the mastoid process. There only remained the conditions localized in the antrum and mastoid process.

It was desirable to differentiate between antrum and mastoid suppuration, because suppuration limited to the antrum was often cured without operation. When the discharge was slight, and remained about the same in quantity, there was a great probability that an uncomplicated antrum suppuration was present. A more exact description of the symptoms which indicated retention and increased pressure in the antrum and mastoid cells than Dr. Luc had given, was possible, and would enlarge the number of cases in which the indication for operation was urgent.

Professor GRADENIGO (Turin) said that, having performed a great number of middle-ear operations by the retro-auricular method in cases of chronic suppurative otitis media, he had come to the conclusion that the indications for the operation, such as had been generally stated in the discussion, were exaggerated. For the purpose of healing simple chronic pathological conditions of the tympanic cavity, the extraction of the ossicles, or even of the hammer only, and removal through the external auditory canal of the posterior superior bony wall, were for the most part sufficient. In such cases the retro-auricular method did not give better results, and even exposed the patient to risks of various

kinds. It required a long after-treatment, difficult to be carried out, especially in children, and the final result often compromised the success of the best performed operation. Amongst the decided indications for the retro-auricular operation, with the opening of the mastoid, must be considered the cases of cholesteatoma antri, and all cases where symptoms existed pointing to mastoideal pathological conditions or to intracranial complications. Regarding the technique, he preferred the Zaufal-Stacke method.

Dr. NOYES (New York) said while he fully agreed with the advisability of operative treatment for cases where there was any bone disease, he recommended the dry treatment. There was a class of chronic cases in which the acute process might have already considerably subsided, for which the treatment by dry powdered boracic acid was most effective.

Professor KÜMMELL (Breslau) said: "One class of cases has not been mentioned — hysterical girls; they are able to imitate any kind of symptoms. I want to illustrate this by reporting the case of a girl who has been operated upon for the fifth time, and never anything has been found. The skull has been trephined over and over, until there is a defect of the size of the palm of the hand. Her brain has been punctured in at least twenty places. Still, about every six months she becomes ill with the same symptoms; she reproduces all the appearances of dizziness; she shows facial paralysis by contracting the one side of the face or the other; she has temperature up to 40.2° C., or $104\frac{1}{2}^{\circ}$ F. This girl is quite well now, with her over twenty punctures of the brain and seven or ten narcoses."

Professor EEMAN (Ghent), on the subject of opening the mastoid, said that, speaking generally, he was a very warm advocate of the radical operation, but he thought it was a duty in many cases to try *at first, before* performing a radical operation, *all* the other means of treatment.

He particularly wished to direct attention to the cases in which the extraction of the malleus is sufficient to effect a complete and lasting recovery. He said that in his clinic the extraction of the malleus had been performed very often, and with splendid results, about 15 per cent. of the cases being entirely cured. Some of these cases came under treatment with conditions which would certainly have led other surgeons to an immediate and radical mastoid operation, such as fever, intracranial symptoms,

inflammation and narrowing of the external auditory canal, etc. In these cases, under appropriate treatment, inflammation subsided in a few days, and then it was possible to ascertain that there was perforation of the membrane of Shrapnell, and caries of the head of the malleus. Extraction of this ossicle gave a perfect cure; some of the cases had continued under his observation for years after the operation, and he was able to state that the results had been lasting. Professor Eeman desired to warmly advocate the extraction of the malleus in cases of chronic purulent otitis presenting perforation of Shrapnell's membrane and caries of part of the malleus, and the postponement of the radical operation until it had been practically demonstrated that the removal of the malleus was insufficient to cure the patient.

Moreover, he said that he could not agree with the assertion of Schwartze, that isolated caries of the malleus was rare, and that as a rule both incus and malleus were affected at the same time; in his clinic isolated caries of the malleus had been found to be frequent.

Dr. OSCAR BRIEGER (Breslau) expressed himself as follows: Among the indications for radical operation we have included the failure of local medical treatment to produce a cure. According to the present standard of our knowledge this indication will have to be admitted to some degree. But it would be erroneous to deduce that the operation would render subsequent treatment superfluous. On the contrary, after the operative opening of the cavities of the middle ear, the alterations of the mucous membrane, which may become manifest, besides the morbid foci in the bone, may require further local treatment. It is occasionally possible to shorten the after-treatment by combining it with local treatment of the mucous membrane. It is, for instance, advisable in processes which reveal lasting maceration of new-formed or implanted epidermis to plug with gauze soaked in alcohol. Formalin also answers those purposes, as well as combinations with other drugs—for instance, weak solution of nitrate of silver in alcohol—according to the intensity of the process in question.

Luc recommends especially the evacuation of the cavities of the middle ear. If it is to be understood by this that after each radical operation the ossicles ought to be removed, it must be objected that in the interest of the function the preservation of these has been advised. In general this advice is superfluous, because the connection of the columella is in those cases interrupted by

destruction of the long process of the incus. It is quite true that the function is sometimes remarkably good after this, in general, complicated method. But it happens that even after complete skinning over of the cavities of the middle ear foetid secretion continues from carious points of the remaining malleus. And this is less accessible for treatment, and more dangerous, because the local conditions are altered to a variable extent by adhesions, etc. It is necessary, at least, to make careful selection of those cases where the ossicles are to be preserved. With regard to the contra-indications of the operation, Dr. Brieger is inclined to exclude meningitis. There are cases where marked symptoms of meningitis are present, and nevertheless there is only circumscribed suppuration, which may heal if new infection from the cavities of the middle ear is excluded by means of an operation; but recovery may take place in spite of diffuse meningitis, as ascertained by lumbar puncture, if the primary centre of infection is destroyed by radical operation, and if by this puncture more favorable conditions are created, recovery may in those cases be effected by removal of the infected material, by the lumbar tapping, or perhaps at the same time by the production of new transudating lymph, which may have some bactericidal property. Of course successes of this kind are rare in extensive meningitis, but are sufficient to justify us in rejecting extensive meningitis as an absolute contra-indication of the radical operation, the more so as the operation itself is harmless in those desperate cases.

Dr. BARR (Glasgow) regretted that the subject of their discussion excluded the methods of operation, and the results of operations, especially the latter, because he thought that one of the most important considerations with regard to the subject was the results of operative measures in chronic suppuration of the middle ear. Probably the most interesting class of cases was that for which there was no immediate demand for operation—cases where there were no objective or subjective symptoms demanding speedy operation. We were indebted to Professor Macewen for uttering a warning about continuing the treatment by the external meatus too long before adopting operation. We must not, however, be too much discouraged by certain dangers from the ordinary treatment referred to by Professor Macewen, such as the removal of granulation tissue or polypi, as the experience of otologists showed that these were not great. Still, it was well that a surgeon of Professor Macewen's vast experience should

utter those words of warning. Although the question of attic treatment had been rather disparagingly referred to by Dr. Knapp, Dr. Barr believed that the attic syringe was of great value, although many of the attic syringes in use were too narrow in the bore. He had found in many cases that after the attic treatment, including the removal of the malleus and incus, and the efficient use of a proper attic syringe, no radical mastoid operation was required.

Professor FARACI (Palermo) thanked Professor Gradenigo for approving of his osteotomy forceps. In the majority of cases he had found the removal of the larger ossicles and the resection of the outer wall of the attic and antrum sufficient. He thought it non-justifiable to open the mastoid as a whole till the ossicles had been removed through the meatus. As regards endocranial dangers there were two categories : (1) If the complication had occurred, the mastoid was a small part of the whole operation. (2) If the complication was only threatening, the operation through the meatus sufficed, as in a case quoted with meningitis symptoms.

His conclusions were that the mastoid should be opened :

1. When it was invaded by the morbid process in whole or in part.
2. When all the other methods of treatment, including the ablation of the larger ossicles and the resection of the outer wall of the tympanic attic and mastoid antrum, had been found fruitless.
3. In cases of manifest intracranial complications, the mastoid operation being followed by the further interference the complications demanded.

Dr. SUAREZ DE MENDOZA (Paris) thought that pain alone was not necessarily an indication for opening up the cavities of the middle ear in their totality. Sometimes in such cases the mastoid was found almost or quite healthy, and the pain was due to eburnation of the mastoid cells. Simple gouging of the mastoid, or its erosion by means of an electric burr might be sufficient in such cases. With pain as the sole indication, we might cease operating deeper if the condensation of the bone and the absence of pus or granulations allowed us to attribute the pain to the condensation of the osseous tissue.

Dr. MILLIGAN (Manchester) said that in cases where local treatment had been faithfully tried for a period of twelve months, and where suppuration persisted, he was in favor of performing a

mastoid operation. By local treatment he included the ordinary methods of antiseptically cleansing the parts, the removal of granulation tissue, the removal of diseased ossicles, etc.

Where such methods failed he thought recourse to an exploratory operation justifiable. By its means the paths of infection could be followed up, concealed foci of sepsis attended to, and extension to more deeply seated parts frequently arrested.

He desired to associate himself very largely with the opinions expressed by Professor Macewen.

Mr. T. MARK HOVELL (London) said that the mere fact that a discharge had existed for a long time was not a sufficient reason for the mastoid process being immediately opened up. He considered that the operation should not be undertaken in chronic suppurative inflammation of the middle ear until the ordinary methods of treatment had been fairly tried. About ten years ago he saw a lady who had a discharge from one ear which had lasted for forty-three years. It ceased entirely after about six weeks' treatment by the usual method with an antiseptic lotion and dry boracic powder. The discharge had not returned.

Mr. Hovell was of opinion that when the attic was cleared out the mastoid antrum should be opened at the same time, otherwise a second operation might become necessary.

Dr. C. R. HOLMES (Cincinnati) said he had practised, and was likely to continue to practise, the lines laid down by Professor Macewen. Dr. McBride had said that we could not promise results in mastoid cases. He certainly wished to declare himself against that statement. He believed that in almost every case we could promise the patient a cure. We should save the patient the possibility of two operations when we knew one thoroughly performed would cure.

Dr. DENCH (New York) said each case must be treated according to the local conditions present. When the mastoid process was involved a complete mastoid operation was imperative. If during the operation the surgeon found that infection of the lateral sinus had taken place, he must not hesitate to remove every source of infection. In one of the speaker's cases a second operation was necessary, owing to jugular involvement.

Mr. CRESSWELL BABER (Brighton) thought that most were agreed that in chronic suppuration of the middle ear, accompanied by mastoid symptoms, the bone should be opened. The interesting point to consider was whether the mastoid should be

opened in cases of chronic suppurative otitis media without any symptoms except the discharge. In those cases he considered that, as a general rule, first of all, every means of arresting the discharge through the meatus (such as careful cleansing, curetting, removal of ossicles, etc.) should be tried, and if the purulent discharge from the tympanum still continued, the risks of pyæmic infection from this focus should be put before the patient or his friends, and the possibilities of an operation on the mastoid placing him in a safer position explained, although, of course, no certainty of a cure could be promised until the parts had been exposed by operation, and the full extent of the disease ascertained.

Dr. J. HOLINGER (Chicago) thought that, more or less, they were all conservative in the treatment of chronic suppuration. There was one class of cases undoubtedly where conservatism was absolutely contra-indicated. It was the case following influenza. Whenever in the course of chronic suppuration of the middle ear, no matter how innocent it looked, acute otitis media followed after influenza, we should not lose time with any conservative measures. The only hope was to operate immediately. He wished to emphasize this point.

Mr. P. R. W. DE SANTI (London) said the duration of the discharge in eighteen patients he had had under observation was from six months to fifteen years. On these eighteen patients twenty-six operations had been performed; twenty-four operations he had found to be perfectly successful; in four cases he had followed the teaching of Macewen.

Mr. F. FAULDER WHITE (Coventry) said it would be a deplorable thing if it went out to the profession that otologists in general were all for operations and not for any other treatment.

Dr. LEDERMAN (New York) observed that a conservative method of treatment was generally approved, but that when the discharge resisted treatment for a certain length of time, all agreed that the mastoid should be opened. He inquired what would be a suitable length of time for treatment.

The PRESIDENT regretted that two of the principal papers were not received in time to print before the discussion. He said it was exceedingly difficult to say which cases should be operated upon, but he quite agreed with general rules laid down by Professor Politzer and Dr. Barr. Replying to Dr. Lederman's inquiry, he said that it was impossible to say how long a case should be

continued with the ordinary treatment before settling upon an operation.

Professor MACEWEN briefly replied, and pointed out that he had not said, as stated by Dr. McBride, that in simple discharge operation should be resorted to. That statement had been made elsewhere, and as he had not paid the slightest attention to it, it had been repeated there. He wished it to be made known that it was not correct.

WEDNESDAY AFTERNOON SESSION was devoted to demonstrations in the museum by Politzer, Hartmann, Turner, Joyce, Katz, and others. See bulletin of first session.

Thursday, Aug. 10th.

MORNING SESSION.

Dr. E. J. MOURE (Bordeaux) read a paper on **a case of cerebral abscess consequent on acute suppurative otitis media.**

When the patient presented himself for examination he complained of very acute pain, which had set in on the seventh day of his disease. In addition he had vertigo, depression, no vomiting, no interference with speech, the mind was clear, and the temperature was normal. On the other hand he had homonymous hemianopsia (right), and word blindness with aphasia and verbal amnesia. These symptoms were confirmed by Professor Pitres, who made the diagnosis of cerebral abscess in the neighborhood of the curved convolutions.

In presence of these distinct cerebral complications Dr. Moure operated on the 4th of January, 1899. The bone was congested, the mastoid process being full of fungous granulations right up to the tympanum. The communication between the antrum and the tympanum having been made free it was seen that the roof of the antrum was necrosed and that a small hard sequestrum separated the cavity from the brain. This sequestrum was removed, no pus escaped, and the meninges appeared healthy. As the diagnosis indicated an abscess of the brain situated in the *cuneus* region, an opening was made in the upper part of the temporal bone at about $3\frac{1}{2}$ centimetres above the auditory canal. The opening into the skull measured about 3 centimetres in diameter. The crucial incision was made through the dura mater and the pia mater, producing slight hemorrhage, which was easily arrested

by compression. A fine bistoury was thrust about 3 centimetres backwards and a little upwards into the cerebral substance, but this puncture was immediately followed by as considerable a spurt of blood as if the sinus had been widely opened. Compression with gauze was maintained for some time while the antrum and tympanic cavity were being dressed. When this was finished the cerebral compression was removed, but the hemorrhage recurred so abundantly that it was impossible to continue the operation. A plug of gauze was therefore placed at the opening into the brain, and the hemorrhage was easily arrested in this way.

Next day the general condition was good, the patient talked freely but had paræsthesia, and the general sensibility was almost abolished on the opposite side to the lesion. The right arm was also somewhat paræsthetic.

A few days later the patient was again anæsthetized, the plug was removed and it was then easy to see that the pulsation of the brain was normal. The skin was joined in order to avoid cerebral hernia, and a piece of gauze was left in the brain.

On the 10th of January the sensitiveness had returned, the general condition was good, and there was no fever. Dr. Moure was obliged to be absent for some days and the patient was dressed regularly until the 15th of January when the dressing was found saturated with pus which had run even on to the shoulder of the patient, in fact the cerebral abscess had emptied itself by the orifice made through the brain. The hemianopsia had disappeared. A rubber drainage tube was placed in the cavity. Improvement went on until the 24th of January when the patient complained of the dressing hurting his head, and on removing it a cerebral hernia was found of the size of a small tangerine orange. On the 26th of January the patient became comatose and died suddenly in the evening.

At the post-mortem it was easy to see that there was in fact an abscess which had opened externally and which opened into the ventricle, causing the patient's death. The abscess in fact was found at the level of the curved convolution; but it was not surrounded by a limiting membrane, so that the flow of pus was followed each time by a certain quantity of cerebral material, and hence the ulcerative process which had unfortunately caused the death of the patient.

The case is interesting because of the considerable hemorrhage

which followed the puncture of the brain, and which was probably the result of opening a very congested vein,—a vein which probably accompanied a deep cerebral sulcus. The case is also interesting because of the slight symptoms of reaction which followed this abundant hemorrhage and the consequent plugging. Finally, the case proves once again that abscesses of the brain are always serious when they have no limiting membrane, and that, when in doubt, it is preferable not to make any injections.

Dr. E. B. DENCH (New York) read a paper on **the operative treatment of mastoid inflammation.**

Examination of the statistics of the larger hospitals in New York City devoted to the special treatment of diseases of the ear showed that ten years ago the mastoid operation was rarely performed. During the last few years it has been performed almost daily. Another important fact was, while in former years the treatment of intracranial complications of suppurative middle-ear inflammation was relegated entirely to the general surgeon, at the present day these operations were performed by the otologist. Regarding the indications for opening the mastoid process in chronic suppurative otitis media, it is my opinion that the indications for the operation laid down by Schwartze many years ago were those followed at the present day. The only difference was that under improved surgical technique, by which perfect asepsis was secured, the surgeon did not hesitate to act on these indications immediately. For this reason the number of operations was relatively greater than in former years. If asked to give the signs which seemed to indicate the necessity of operative treatment in this condition, I should name two : (1) Local tenderness over the region of the antrum, and (2) a sagging of the upper and posterior wall of the external auditory meatus close to the membrana tympani. When these signs exist operative interference is always indicated. Experience has shown that the temperature of the patient furnishes but little indication. Spontaneous pain might also be absent although the mastoid might have undergone extensive destruction. Many surgeons regard "tip tenderness" as an important diagnostic point. In my experience it has proven of but little value. Owing to the increased frequency with which the mastoid operation is performed it might be as well to consider any possible dangers which might arise in the operation itself. My own statistics show that out of 228 operations upon the mastoid process in no case could death be attributed to the operation. Where

intracranial complications existed, operative treatment offered the only means of relief. In 13 cases in which thrombosis of the lateral sinus was present, death followed in but 2 cases. One patient died of acute nephritis, which was probably caused by ether narcosis. Where there was an epidural abscess my statistics showed that of 14 cases operated on all recovered.

Regarding the radical operation for the relief of a chronic purulent otitis media with involvement of the mastoid (the Stacke-Schwartz operation), 17 cases have been operated on. Of these 12 were cured and 5 improved. It can therefore be easily seen that the mastoid operation is not in itself a dangerous procedure if the rules of aseptic surgery are closely followed. No operation of this character should be performed without the strictest antiseptic precautions both as regards the field of operation and the instruments, also the surgeon's hand. If proper care was taken, the exposure of the meninges, either in the middle or posterior cranial fossa, or exposure of the opening of the lateral sinus, did not increase in any degree the mortality of the operation. On the other hand, I have found that the more extensive and radical the operation, the better the result. The surgeon who operated most frequently and most radically was really more conservative than he who waited for very pronounced symptoms. Regarding the technique, all details of preparation of the operative field should here be undertaken with strict surgical cleanliness. The primary incision should lie close to the line of auricular attachment and should extend from just below the tip of the mastoid to just above the external auditory meatus, the soft parts being divided down to the bone. In this manner a very narrow anterior flap was formed. The anterior flap was pushed forward by means of a periosteum elevator, exposing thoroughly the superior and posterior margins of the bony external auditory canal. All bleeding points were secured by means of artery clamps. The next step was to sever the attachment of the sternomastoid muscle. This was best done by means of blunt scissors curved on the flat. The tendinous attachment of the muscle should be divided until the finger can be passed beneath the tip of the mastoid into the digastric fossa. In every case the mastoid antrum should be first entered. This applied not only to those cases in which perforation of the cortex was present near the region of the antrum, but also where spontaneous perforation had taken place into the digastric fossa through the internal plate of

the mastoid. For removing the mastoid cortex he preferred either the chisel or the gouge. The bone should first be removed as close to the posterior wall of the bony meatus as possible and not above the spina supra-meatum. The opening in the bone should be gradually deepened until a probe could be passed through the mastoid antrum into the middle ear. The wound should then be explored by means of the probe to ascertain whether the bony walls were intact. After the mastoid antrum has once been entered the topography of the process is evident. The entire mastoid cortex should then be removed by means of the chisel or gouge and the tip removed by the bone forceps. Great care should be taken to thoroughly curette the aditus ad antrum so as to permit free drainage of the middle ear through the posterior opening. Experience has taught me that the operator was inclined to do a less radical operation than was absolutely necessary. In my later cases I have found not infrequently that the bone seemed almost normal. Close inspection, however, revealed the fact that it was a little congested and slightly dark in color. With reference to any possible accidents that might occur during the operation, these were of trifling importance provided aseptic treatment was carried out. I never operate upon a case without expecting to expose or open the lateral sinus or to enter the cranial cavity. The exposure of the sinus in doubtful cases is imperative, and if its appearance is not perfectly normal a free incision should be made into the vessel. No harm could possibly result from this procedure, and many a life which would otherwise be lost might be saved by what was apparently a radical and uncalled-for procedure. The same applies to entering the middle cranial fossa. My own cases which have terminated fatally have been those in which I had not done a complete and radical operation.

Dr. KNAPP (New York): Do you attach the same importance to tenderness on pressure in acute cases as in chronic? Dr. Dench replied in the negative. (From *The Laryngoscope*.)

Dr. DELIE (Ypres) read a paper on **panotitis; cerebral complications; death; post-mortem.**

A patient, aged forty, presented all the symptoms of chronic inveterate neuralgia of the right trigeminal. Deafness declared itself, and was found to be due to an exostosis of the right external auditory canal. An operation restored his hearing but produced no change in the right hemicrania. A few days later

symptoms of acute mastoiditis declared themselves, accompanied by vertigo, and a hardly perceptible otorrhœa. A Stacke's operation showed the only lesions to be purulent infiltration of the external wall of the apophysis and a small polypus in the attic. The patient died comatose a few days afterwards.

At the post-mortem examination the following lesions were discovered :

A purulent infiltration in the bony roof of the right middle ear. Symptoms of acute meningitis limited to the anterior surface of the bulb, spreading from the side of the affected ear to the inner third of the cerebellum, and compressing on the left side all the meninges which covered the left side of the cerebellum. There was pus in the fourth ventricle, and in the left lateral ventricle. The left ear was free of any pathological lesion, and the same could be said of all the other parts of the endocranium and its coverings, as well as of the bony skull.

Mr. A. H. CHEATLE (London) read a paper on **the petro-squamosal sinus—anatomy and pathological importance.**

As little or nothing is written in even the best works on otology concerning this sinus, which has most important connections with the middle ear both from anatomical and pathological stand-points, I have thought the subject of sufficient interest to bring before the Congress. The following British authors have written on the subject : J. F. Knott, of Dublin (*Journal of Anatomy*, vol. xvi., page 27), who quotes C. Krause, Luschka, Otto, and Sir Charles Bell ; Henry Morris (*Anatomy*, page 661), Professor Maccewen (*Pyogenic Diseases of the Brain and Spinal Cord*, pages 2 and 8), and Quain (*Anatomy*).

COMPARATIVE ANATOMY.

In some lower animals, dog and calf for instance, this sinus runs across the roof of the middle ear, making its exit by means of a large foramen between the base of the zygoma and the bony meatal wall, and serves almost entirely for the exit of the intracranial blood, taking the place in fact of the sigmoid portion of the lateral sinus.

In the higher forms of monkeys, such as the chimpanzee, gorilla, and orang-outang, the sinus closely resembles the human.

In the *Macacus* group the young often have the groove which runs along the petro-squamosal suture, and the anterior external opening well marked ; while with the adult the opening is usually

closed or rudimentary, leaving the groove which runs forward to the foramen spinosum. In other varieties, notably in Baboons, *Chrysotrix*, *Cebus*, *Midas*, *Hapule*, *Lemuridæ*, and *Indri*, both the groove and the external opening are well marked, the latter piercing the bone between the large post-glenoid tubercle and the bony meatus. In these the sinus does not take the place of the sigmoid portion of the lateral sinus, as it is also present and well marked.

HUMAN ANATOMY.

In early fœtal life, before the formation of the internal jugular vein, the petro-squamosal sinus carries all the intracranial venous blood, emerging in front to open into the primitive jugular (afterwards the internal jugular). It is not to be wondered then that this channel which serves such important duties in early fœtal life should persist in some form or another in later life. The anterior opening usually closes, the sinus or its remains at its anterior extremity forming a connection with the middle meningeal vein. The sinus dwindles to a small size, while the opening into the lateral sinus often persists.

With regard to the persistence of the anterior opening in front of the meatus in adult life, I examined 2585 skulls in the Royal College of Surgeons' Museum, and among this number I found in 23 rudimentary remains, 3 in the glenoid cavity, 3 in the zygomatic process itself, 6 in the base of the zygoma, and 11 just external to the Glaserean fissure, with sometimes a fine groove running outwards and occasionally bridged over by the junction of the post-glenoid tubercle with the bony meatus. I must here say that it is the rule rather than the exception for remains of the sinus to be present in some form or another all through life. In this statement I am supported by my friends, Mr. Arthur Keith and Mr. Cadman. Unfortunately it is impossible in the time allowed me to describe minutely the different varieties, but in the photographs to be shown directly some idea can be obtained, and some specimens of my own are now in the Museum.

In infancy and childhood the sinus as a rule had a well-marked opening into the lateral sinus behind by means of a valve-like opening, and in front joining the middle meningeal vein, while in adult life, although it is often marked, careful search has sometimes to be made. The absence of markings on the bone in the neighborhood of the suture does not by any means show that the sinus is not present. In infancy and early childhood, in the region

of the posterior extremity of the suture, numerous irregularities are often seen ; it is at this spot that a bridge often forms over the posterior end of the sinus before it opens into the lateral sinus, a common condition in the adult bone. I will now show photographs of a few specimens in my collection.

(A series of excellent photographs demonstrating various phases of the sinus were thrown on the screen.)

On looking at the roof of the middle ear in a fresh specimen after the dura mater had been stripped off, a network of rather large veins can be plainly seen immediately beneath the bone ; from this network several veins emerge through the suture to empty into the sinus.

In children in which the interval between the suture is wide these are sometimes numerous, especially posteriorly. In the adult a fairly constant one is present on a vertical level with the membrane ; or more may be present at intervals. These emerging veins receive a fine covering representing the meninges.

Occasionally the openings of fairly large veins can be seen on the cerebral side of the sinus, especially at its anterior part.

PATHOLOGICAL IMPORTANCE.

It is therefore seen that there is a connection between the veins of the middle ear and those of the meninges, and occasionally, at all events, with those of the temporo-sphenoidal lobe, and through the meningeal coverings the middle ear is in communication with those of the middle and posterior fossæ. Under these circumstances the importance of this sinus, with its tributaries and connections, from a pathological point of view, is very evident, and explains how infection may spread from the middle ear to meninges and brain without microscopical evidence of the connection. Such a state of things is not uncommon, as we all know, in infants and children, in whom, as I have said, the pathway we are considering is well marked and in whom the membrane may be intact. There is a specimen of mine in the Museum, obtained in the post-mortem room from an infant, aged one year, who died of suppurative lepto-meningitis, without a known cause, during an attack of pneumonia. The middle ear was full of pus containing all sorts of pathologic cocci. I cut sections of the emerging vein but was unable to find cocci, but this by no means precludes this as having been the pathway. There was no thrombosis. This is by no means the first case of the sort I have seen.

Occasionally it is seen in adults, but as a rule a perforation is present in the membrane. It is astonishing, in the face of this close connection of the middle ear with the meninges, that meningitis is not of more frequent occurrence. The explanation may be that the meninges, like the peritoneum, are able to deal with a certain amount of infection, and only when the dose is excessive is this resisting power overcome. This pathway will also explain the presence of a cerebral abscess without microscopical connection with the diseased middle ear. That the sinus may be the pathway for septic thrombosis of the lateral sinus I have evidence in two cases.

A. H. Cleveland, of Philadelphia, in the *ARCHIVES OF OTOLGY*, col. xxiv., p. 136, 1895, relates the case of a boy, aged six years, who died of pyæmia. At the post-mortem the petro-squamous sinus was found abnormally large and deep, being at one or two points almost entirely bridged over by bony processes. At its anterior extremity necrosis had taken place and pus had entered the sinus, causing a thrombus which extended backwards into the lateral sinus. Meningitis was present on the same side.

In St. George's Hospital Museum, and now in our own, is a specimen (No. 33a) of the dura mater, with the lateral and longitudinal sinuses, from a man aged twenty years who, after suffering with discharge from the right ear for three months, died with symptoms of meningitis. At the post-mortem examination suppurative meningitis was found over the right side, with septic thrombosis of the lateral and longitudinal sinuses. A vein was found which made a direct communication between the tympanum and the lateral sinus and which would admit the passage of an eye probe.

It may be that we have here one of the pathways which will solve some of the unaccountable intracranial affections met with by the physician, such as the posterior basic meningitis of infants, cerebro-spinal meningitis, and perhaps some cases of tuberculous meningitis, especially when the lining membrane of the middle ear is like the following photograph (shown).

It is taken from a section of the lining membrane of the middle ear of an infant who died of tuberculous meningitis and general tuberculosis. Tubercle bacilli can also be seen in another section (to be seen in the Museum).

I should like to draw attention to the condition of the middle ears of children who have died of general tuberculosis, including

meningeal tuberculosis. There is thin, purulent matter in the cavity, often with an intact drum, irregular thickening of the lining membrane, which on section shows patches of well-marked infiltration, but no tubercle.

In conclusion, I wish to give my best thanks to the Council of the College of Surgeons, to Prof. Chas. Stewart, F.R.S., and Mr. Arthur Keith.

Dr. KNAPP (New York) said that he was sure he was speaking the sense of the convention if he expressed his most hearty thanks to Dr. Cheatle, not only for the instructive demonstration and his important remarks on the petro-squamosal sinus, but also on his untiring efforts in bringing about such a unique otological museum, which they had all admired and studied with keen interest. His attention was first drawn to the significance of the petro-squamosal sinus by the case of Dr. Cleveland, of Philadelphia, which Dr. Cheatle quoted, and of which Dr. Cleveland had sent the speaker his manuscript, with the remark that in text-books of aural surgery, and also in those of descriptive anatomy, nothing, or almost nothing, was to be found on the topic. He looked up the subject and found only a short but very good description (about 15 lines small type) in Quain. Now that authoritative attention had been directed to this sinus we may expect to hear more about it. He felt sure that by its knowledge we should be able to understand many symptoms *in vivo* and at autopsies which thus far had been obscure. (From *The Laryngoscope*.)

Professor V. GRAZZI (Florence) read a paper on **a new treatment for chronic catarrhal inflammations of the pharynx connected with diseases of the ear.**

After referring to the frequency of chronic catarrhal pharyngitis and the inefficiency of all the methods hitherto proposed for its treatment, the author discussed the varieties and different degrees of the affection. He presented some microscopic preparations in order to show the normal structure of the pharynx and the alterations produced in it by chronic catarrh with hypertrophy of the adenoid tissue. He remarks that the structure of the pharynx itself suggested to him the method of treatment under consideration,—a method which consists in the compression or crushing of the diseased tissues. Consequent on these manœuvres, repeated more or less frequently, the tissues become less inflamed, the granulations are absorbed, the function of the glandular tissue is re-established, as well as the circulation in the blood-vessels and lymphatics.

Professor Grazzi carries out this treatment by means of small metal probes, bent at an angle more or less obtuse ; the small probes end in a kind of fork into which are fixed small rollers. These are pressed up and down on the pharynx with more or less force, according to certain indications mentioned by Dr. Grazzi, and have been found very useful in certain cases where the disease had spread to the middle ear. The instruments were demonstrated at the congress.

Dr. ARISTIDE MALHERBE contributed an elaborate paper on the **surgical treatment of dry chronic middle-ear inflammation by scooping out the petro-mastoid bones**, published in pamphlet form. Paris, 1899.

Dr. LOUIS BAR (Nice) read a paper on the **diagnosis of anterior abscesses of the mastoid, and of furunculosis of the external auditory meatus**.

Otologists are agreed that they sometimes find it difficult, if not impossible to make a diagnosis between abscess of the limiting cells of the mastoid process and furunculosis of the meatus externus. In such cases a reasonable diagnosis can only be made from deductions drawn from a perfect acquaintance with the anatomy and physiology of the region and at the same time from the general aspect and progress of the case. The following deductions may be drawn :

I. That lymphangitis and early periauricular adenitis are the rule in all furuncular affections of the meatus ; and are late and exceptional in purulent inflammations of the limiting cells. This is consequent on the difference between the lymphatic systems of the external and middle ear.

II. That perimastoid œdema effaces the retro-auricular depression in furunculosis, whereas in mastoiditis the retro-auricular depression persists and remains circumscribed.

III. That the pharyngeal plexus may become visible through venous stasis induced by the mastoiditis.

IV. That, in consequence of the different innervation of the tympanum and the meatus, spontaneous pains and sensitiveness are more acute in furunculosis ; they are less marked in general in anterior abscess of the mastoid.

V. That, also for neurological reasons, in inflammation of the anterior cells, facial paresis is sometimes observed, an exaggeration of gustatory sensitiveness, and particular sensitiveness of the pharynx and end of the tongue.

VI. That the bacterial nature of the pus is different in the two diseases.

VII. That in absence of any febrile condition a continuous disproportion between the pulse and the temperature is in favor of mastoiditis.

Dr. LANNOIS (Lyons) contributed a paper on **epilepsy of aural origin**.

Dr. Lannois gave the history of a patient aged twenty-six, of tuberculous inheritance, but without any pulmonary symptoms, who was attacked with double otorrhœa at the age of seven, and epilepsy at the age of thirteen. When he presented himself for treatment in April, 1897, he had, as a rule, an epileptic attack every week. One ear had cicatrized, and had been dry for some time. The other ear was still suppurating, the drum entirely destroyed, cicatrizing in part, but with two ulcerations below and in front. Cure was obtained in a few weeks, and the hearing for the watch, which had been only on contact, improved twenty and twenty-five centimetres. At the same time the epileptic attacks disappeared, and in March, 1899, the patient returned of his own accord, to say that he had remained cured since, and that his ears were quite dry. During the year 1898, he had had only two slight attacks of vertigo,—the last being in the month of August.

Cases like this, where the connection between the otic lesion and epilepsy appears well marked, are very rare. It is this fact that gives interest to the above case, and shows the importance of treating the ears when they are affected in epileptics.

Mr. GALBRAITH CONNAL (Glasgow) contributed a case of **sarcoma of the external auditory canal**. (Photographs of the patient and sections of the tumor were shown in the hall of the Congress Museum.)

Malignant tumors of the ear are rarely met with. Of the two forms of malignant disease, sarcoma of the ear is more uncommon than carcinoma. On looking over the statistics of the Glasgow Ear Hospital for the past twelve years, I find that in an aggregate of nearly 15,000 cases malignant disease is noted as occurring six times,—once in 2500 cases,—four times epithelioma, and twice sarcoma. These figures nearly agree with those of Bürkner, which are often quoted. More recently Asch, in 1896, in reporting a case of sarcoma of the auricle, mentioned that he had found only ten cases of sarcoma of the ear described in literature.

Of the two cases of sarcoma which have occurred at the Glasgow Ear Hospital, one was reported by Dr. Barr in the *British Medical Journal* for October, 1897; the second is the case which I have the honor of submitting.

These two cases were in marked contrast in the way they developed. In Dr. Barr's case, where the sarcomatous mass originated in the middle ear, there was no external growth, and the symptoms latterly pointed to some intracranial mischief suggesting temporo-sphenoidal abscess. In the present case, where the sarcoma originated in the external auditory canal, the development of the tumor was outwards, and gave rise to a large swelling in front of and behind the ear.

The patient was a girl six years of age. About eight weeks before she came to the hospital, her mother noticed a small growth — said to be quite painless — in the external auditory canal. A portion of this growth was removed by the family medical attendant, but it quickly recurred, and afterwards pain was persistent and severe. Facial paralysis set in seven days later and persisted. There was no history of purulent discharge from the ear.

Inspection showed a grayish-looking mass occupying the external meatus. It was exceedingly painful to the touch, and with the probe it was found adherent along the posterior wall of the canal. There was slight matting of the tissues in front of the ear over the parotid, and the gland at the angle of the jaw was enlarged. As already mentioned, there was marked facial paralysis on the same side.

Under chloroform the whole mass was curetted from the wall of the canal. The tympanic membrane was found destroyed, and the bone on the inner wall of the tympanum denuded of periosteum. This gave relief from pain; the patient slept well, and put on flesh. But in about a month's time the growth recurred, and rapidly involved the mastoid region and the tissues in front of the ear. The great involvement of these regions by the extension of the tumor outwards is seen from the photographs.

The patient died seven months after her first visit to the hospital. No post-mortem examination was allowed.

Sections of the tumor showed a spindle-celled sarcoma, with the sarcomatous growth extending along underneath the epidermis.

These malignant tumors of the ear, though rare, are very

interesting. A point of practical importance lies in the diagnosis. As we know, sarcoma is apt to manifest itself in the earlier years of life, at a time when we often meet with polypi and granulations in the external auditory canal as the result of neglected purulent otitis media. Excessive pain should always excite suspicion of malignant mischief, and lead to a microscopical examination of the tissue. So far as I have examined the literature on the subject, excessive pain is the prominent symptom. If in addition to pain there is marked and rapid recurrence of the growth, with glandular involvement, we have a group of symptoms which should make one careful as to the diagnosis and prognosis.

In the present case the excessive pain, and — what was very marked — the grayish look of the tumor, which was unlike ordinary granulations, the intimate adherence of the tumor to the posterior wall of the external auditory canal, the matting of the tissues in front of the ear, the glandular involvement, and the facial paralysis — these, apart altogether from the history of the case, presented a clinical picture which at once arrested attention, and led to a microscopical examination of the tissue being made, when the diagnosis of sarcoma was confirmed.

Dr. RUTTEN (Namur) showed an **exostosis of the right auditory meatus**.

The osseous anomaly was remarkable for its large size. It measured fifteen millimetres in length, and twelve millimetres in thickness. It filled the external meatus so completely as to prevent the introduction of the smallest probe between the cell and the tumor. Besides, by its compressure, the excrescence had destroyed the skin and caused an osteo-periostitis of the canal. This secondary suppuration complicated by the retention of pus in the middle ear with the commencement of cerebral symptoms, compelled the patient to let himself be operated upon.

The exostosis is remarkable, in addition to its extraordinary size, for the long time it had been in the ear without causing any trouble. Its slow development had taken place unperceived. The patient was thirty-eight years of age at the date of the operation; he was a cooper by occupation, had served in the army and had never suffered from running from the ear. Seven years before the operation he had consulted Dr. Rutten for deafness. At that time the exostosis already completely obstructed the meatus, and the patient was much astonished when he touched with his little finger a hard body which was only distant a few

millimetres from the entrance of the ear. He had never suspected its presence. At that date the operation proposed was declined, although the dangers of suppuration were pointed out,— complications which, as a matter of fact, set in seven years later. One might therefore safely say that the tumor had been fifteen to twenty years in developing.

The exostosis, of the consistence of ivory, was pedunculated. It was covered with a thin, transparent skin, and was implanted on the postero-superior wall, occupying the whole bony part of the canal. Under an anæsthetic it was removed with the gouge, without turning down the auricle. The result of the operation was immediate restoration of hearing and cure of the otorrhœa.

P. LACROIX (Paris) read a paper on **otitic complications of ozena (ozena of the ear)**, in which he first reports the case of a girl suffering from acute otitis media in whose ear, after paracentesis, he found the characteristic secretion of ozena — that is to say, a liquid matter in which were little crusts presenting quite the special odor of ozena. This is obviously a case of ozena of the ear.

The author next gives the result of his researches in forty-two cases of ozena. In thirty patients he found lesions of the middle ear. It should be added that, under such circumstances, a careful examination of the ear is necessary.

Finally, the author concludes that the otitic complications of ozena are very frequent and deserve the name of *ozena of the ear*.

(From *The Laryngoscope*.)

Prof. OSTMANN, of Marburg, Germany, speaks on his **therapeutic results with vibratory massage in chronic hardness of hearing**. He uses a massage apparatus, moved by electricity, of Hirschmann, Berlin. The external auditory canal is closed air-tight by the end piece of the apparatus. The to-and-fro movement of the piston is 2 mm, and imparts 1000 to 1200 puffs on the drumhead in ten minutes. No unpleasant reaction follows. Thus far he has tried this mode of treatment in four cases, which he details. Results: the objective condition unchanged; tinnitus was never increased, but gradually diminished, yet it disappeared in no case, though it did not return in its former intensity; the range of audition — lower- and upper-tone limits — was in several cases perceptibly widened. Ostmann considers his communication not as something definite, but as an invitation to collective scientific labor, in order to find more

surely and quickly the granule of gold which seems to inhere in this mode of treatment. He deems the method indicated in chronic hypertrophic otitis media catarrhalis and in protracted cases of hardness of hearing left after acute otitis media.

(From an abstract of the author, with a plate indicating the examination of the hearing function before and after the treatment, in the *Zeitsch. f. Ohr.*, xxxv., p. 287.)

TH. HEIMAN, Warsaw. **Primary inflammation of the mastoid process.** The speaker has very rarely met with cases of primary periostitis of the mastoid, and never has he seen a case of idiopathic inflammation or suppuration limited to the mastoid cells. The cases of primary periostitis which led to a subperiosteal abscess were always caused by traumatism, once only by erysipelas. Those cases which did not produce abscesses, but disappeared by absorption, or left a thickening of the periosteum (hyperplasia), were caused by traumatism, colds, syphilis, or gout. A certain number of cases, looking like primary ones, manifested themselves later as originated in suppurations of neighboring structures. He details three cases of purulent mastoiditis where the middle-ear affection was so insignificant and transient that it might readily have been mistaken for primary mastoid suppuration.

(From the paper published in full in the *Annales des mal. de l'oreille*, etc., Nov., 1899, p. 475.)

Dr. F. ROHRER, Zurich. **The blue coloration of the drum (tympanum cœruleum) and the formation of varices in the drum membrane.** Rohrer describes the color of the normal tympanic membrane at different ages, speaks of the blue aspect which in rare cases is noted in the lower part of the drum membrane when by dehiscence of bone at the floor of the tympanic cavity the jugular bulb projects into the latter. R. then details a case observed by him these five years where there were from one to four blue nodules on the posterior surface of Shrapnell's membrane, appearing and disappearing from time to time. They were true varices.

(From *Annales des mal. de l'oreille*, etc.)

Dr. LOUIS BAR, Nice. **Differential diagnosis between anterior mastoid abscess and furuncle of the ear canal.** Bar relates four incident cases, and then discusses the differential diagnosis between the above affections. He particularly and justly advises us to rest our judgment chiefly on the anatomy of

the parts. The anterior mastoid abscess is commonly accompanied by perforation of the drum membrane and otorrhœa, the swelling is in the deepest part of the canal, the mastoid itself is painful and sensitive to pressure; commonly there is rise of temperature at the onset, later no fever; the course is slow. The furuncle effaces the retro-auricular furrow, the mastoid abscess does not materially change it. Lymphangitis and preauricular adenitis are usually early symptoms of a furuncle, whereas they are either absent or little conspicuous in anterior mastoid abscess. Dr. Bar says that Lubet-Barbon and Broca¹ have nicely traced the symptomatology of anterior mastoid abscess, but he thinks that the differential diagnosis between it and the furuncle is frequently quite difficult, if not impossible for a time.

Dr. MARCEL LERMOYEZ, Paris, makes some remarks on the **infectiousness of acute suppuration in the middle ear.**

A woman, nursing her husband during grippe which was complicated with a mild acute otitis, is affected in the same way. Two sisters with herpetic angina suffer from acute otitis media alike. Two other sisters are affected simultaneously with measles, otitis, and adenitis. Two children had a mild attack of grippe complicated with otitis and tympanal ecchymosis. A brother and sister, doing farm labor, were sick with hemorrhagic otitis. A lady was affected with bilateral hemorrhagic otitis during mild influenza, her nurse in the same way two days later. A chambermaid had otitis, a young man who was about her contracted otitis of the same kind four days later.

Lermoyez is of opinion that a healthy person coming in contact with a man suffering from otitis may catch the disease. In Paris hospitals observations have been made which seem to confirm his supposition. In the Hôpital des Enfants Malades about 20 per cent. of the children were attacked with otitis, whereas in the private practice of the attending physician only 1 per cent. Similar observations were made in other hospitals. The transmitted otitis has the same form as the primary. Lermoyez concludes that persons, especially children, suffering from otitis should be isolated.

Dr. GARNAULT, Paris, speaks on the **mobilization of the stapes.** A man, seventy-two years old, who had been hard of hearing forty years, completely deaf fifteen years, received considerable improvement from mobilization of the stapes, which has

¹ *Les suppurations de apophyse mast.*, etc., p. 62.

continued these three years. Speaks of other equally favorable cases, and presents a lady patient in confirmation of his statements.

Dr. FISCHENICH, Wiesbaden. **The treatment of catarrhal adhesive processes in the middle ear by injections of pilocarpin.** Fischénich used the remedy in a 20-per-cent. solution in increasing doses in the various sclerosing processes with or without labyrinthine complications. In 120 cases during the last four years the results have been encouraging, and he urgently recommends this treatment. The remedy must be introduced directly into the drum through the tubes. From thirty to fifty applications are required. He states: 1. At the beginning a certain degree of improvement of hearing is obtained. Then the capacity of the mucous membrane for absorption mostly diminishes. 2. A further improvement of hearing can be obtained by a repetition of the treatment at a later period. 3. After total cessation of all treatment improvement may still be noticed.

No reports have been obtained of the papers of Drs. GOLDSTEIN, EEMAN, FARACI, NUVOLI, SNOW, MINK, BRIEGER, HARTMANN, COSTINIU, and AVOLEDO, whose papers are mentioned in the general synopsis, at the first part of this report.

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE SECOND QUARTER OF THE YEAR 1899.

COMPILED BY DR. A. HARTMANN.

Translated by Dr. HERMAN KNAPP.

ANATOMY OF THE EAR.

107. BRÜHL, Z. Radiographs of the cavities of the ear and nose. *Arch. f. Ohr.*, Bd. xlv., S. 117.

108. OKADA. On the surgical anatomy of the ear. *Arch. f. klin. Chir.*, Bd. lviii., Heft 4.

109. PREYSING, HERM. The healthy human tympanum is germless. (From the Pathological Institute of Breslau.) *Centralbl. f. Bact.*, etc., Bd. xxv., Nos. 18, 19.

107. BRÜHL describes drawings of temporal bones and the accessory cavities of the nose, which had been particularly prepared for Roentgen photographs. The method has been fully described in a previous publication of the author ("The Methods of the Anatomical Presentation of the Cavities of the Ear and Nose." In German). It is a pity that the pictures of Brühl could not have been better reproduced. BLOCH.

108. OKADA draws from the large number (111) of openings of skulls at the Berlin Anatomical Institute the following conclusions :

1. Anthropological forms of skull give no sure indications of "dangerous temporal bones."

2. Dangerous temporal bones are met with more frequently on the right side and with small mastoid processes than on the left side and with large mastoids. In the dangerous mastoids ("Proc. mast. infantiles") the mastoid planum forms a very obtuse angle

with the axis of the ear canal. Their diagnosis is further facilitated by (a) the medial position of the spina supra meatum, (b) youthful age (up to thirteen years), (c) female sex. BRÜHL.

109. PREYSING found the contents of the normal tympanic cavities of 69 aseptically opened fresh cadavers germless in 62 cases. The 7 infected ones were not free from suspicion of a previous infection. The tympanic cavities filled with mucus of new-born children, as well as serous exudate (in general dropsy), have equally proved germless. In the acute purulent otitis media of a typhoid patient the author has found typhoid bacilli in the pus. BRÜHL.

PHYSIOLOGY OF THE EAR.

110. SCHWENDT, A., Basel. Experimental determinations of the wave lengths and numbers of vibration of the highest audible tones. *Arch. f. d. ges. Physiologie*, Bd. lxxv.

110a. STUMPF, CARL. Contributions to the acoustics and science of music. No. 2. Leipzig, 1898. Price Mk. 5.

111. HENSEN, V. On the acoustic motion in the labyrinth water. *Münch. med. Wochenschr.*, 1899, No. 14.

110. According to Kundt's methods of dust-figures and their photographs, SCHWENDT ascertained as the normal limit of audibility for high tones :

1. With König's tone-rods $f^7 = 20,480$ v. d.
2. " " tuning-forks $f^7 = 21,845$ v. d.
3. " " Galton whistle $f^7 = 21,845$ v. d.
4. " Edelmann's " $a^7 = 27,361$ "

The alleged g-sharp ⁸ of Appun (50,880) has only from 10,000 to 11,000 v. d. (f^6). Instruments that give 40,000 v. d. have thus far not been constructed, nor can tones of that pitch be heard.

BRÜHL.

110a. C. STUMPF and M. MEYER publish in the above monograph of 170 pages five papers, partly on the physics of music, partly on the physiology of the ear, based altogether on physiological investigations. In the first, Stumpf critically reviews some recent investigations on tone-fusion (Tonverschmelzung). He understands by tone-fusion the unity of sensation produced by the impression of compound tones, such as octaves, fifths, thirds. All observers agree as to the gradual diminution of tone-fusion in the just-named succession. Max Meyer, "On the Theory of

Difference-Tones and on Sensations of Sound in General," is satisfied that the difference-tones are subjective of origin, *i. e.*, produced by a function of our hearing organ.¹ He criticises Ebbinghaus who adheres to Helmholtz's resonance theory and supplements it. Meyer thinks it would be better to give up the theory of resonance altogether because it handicaps the progress of physiological acoustics. He does not want to prop this theory up by explaining, according to it, Bezold's investigations on deaf-mutes. Meyer rests his theory of audition on the supposition of an analysis of the masses of sound in the labyrinth by the differences in the intensity of motion.—To report on the other papers would be out of place in these ARCHIVES. BLOCH.

GENERAL SUBJECTS.

a.—REPORTS AND GENERAL COMMUNICATIONS.

112. BARTH, Prof. A., Leipzig. On the present status of laryngology, rhinology, and otology. Introductory address to his professorship at the University of Leipzig. Leipzig, 1899.

113. WASSMUND, Dr., Military Surgeon. Report on the Ear Department at the Military Hospital I. at Berlin, for the time from Oct. 1, 1896, to Oct. 1, 1898. *Deutsche militärische Zeitsch.*, Heft 6, 1899.

112. BARTH gives a very opportune and comprehensive presentation of the above specialties, with the view that they should receive due recognition in the curriculum and examination of the German student of medicine. The three departments might be taught by one man, who should have a salaried professorship with seat and vote in the faculty, as well as the necessary institutions and assistants for didactic and clinical teaching.

113. The Ear Department of the Berlin garrison has 35 beds and one examination room. According to WASSMUND, during the two years, 459 patients were admitted, 448 for diseases of the ear, and 11 for diseases of the nose; 17 openings of the mastoid, 6 radical operations, and 2 openings of the lateral sinus were made.

b—GENERAL SYMPTOMATOLOGY AND PATHOLOGY.

114. GUYE, A. On agoraphobia in relation to ear disease. *The Laryngoscope*, April, 1899.

¹ Compare these ARCHIVES, ix., pp. 56, 57.

115. BURNETT, CHAS. H. Further observations on the mechanism of aural vertigo and its relief by removal of the anvil. *Am. Journ Med. Sciences*, April, 1899.

116. EGGER, L. Du réflexe binauriculaire, *Ann. des mal. de l'oreille*, etc., 1899, No. 6.

117. LYMES, J. A. The bacteriology of some suppurations complicating pulmonary disease. *Bristol Medico-Chirurgical Journal*, March, 1899.

114. GUYE refers to Lannois and Tournier, in Lyons, who published, some months ago, ten cases of agoraphobia in which various forms of ear disease seemed to be the cause of the neurosis. In three of these cases they saw the agoraphobia disappear after the successful treatment of the ear disease. Guye reports two cases of this disease occurring in connection with disease of the ear. He thinks that in this neurosis the condition of the ears should be investigated.

GORHAM BACON.

115. In this paper BURNETT refers to twenty-seven cases of ear vertigo in which he liberated the stapes by removing the incus, and in which entire freedom from incapacitating attacks of ear vertigo followed the operation. This relief did not always come at once, as long a time as six months having elapsed in some instances before entire relief was obtained. In a few cases the tinnitus was entirely relieved and in the rest of the cases greatly diminished by the operation. The hearing was uninfluenced by the operation.

Burnett reports further a case of mumps affecting both sides and occurring in a healthy man. The left testicle was affected and several days later he had an attack of pleurisy on the right side. The patient complained of shooting pains in the left ear, tinnitus and deafness on the same side. As soon as he was able to leave his bed, he had attacks of vertigo. The apparent motion of objects was always toward his left side with a tendency at times to reel and fall toward his left. Preceding any vertiginous attack there was an increase of tinnitus in the left ear and usually a coppery taste in his mouth.

For about a year following, the vertigo continued until Burnett removed the incus, when the vertigo disappeared.

GORHAM BACON.

116. EGGER supposes that in one of his two cases a plug of cerumen in the left ear was the cause of tinnitus and hardness of hearing not only in that ear but, by the way of reflex through irritation of the tympanic membrane and the sensitive nerves of

the meatus, also in the other (right) ear, for on removal of the plug the symptoms disappeared in both.

In the other case, the binaural reflex did not occur in the ear in which there were scars and absence of the anvil from old sup-puration, where consequently the action of the tensor tympani was eliminated.

ZIMMERMANN.

117. An extremely valuable paper of great interest to otolo-gists was read by LYMES at a meeting of the Bristol Medico-Chirurgical Society on February 8, 1899. In dealing with cases of pneumonia in which one or more foci of suppuration are found in other parts, attention is drawn to, and cases are related of, im-plication of the middle ear. From Lymes's observation the ear trouble may : (i) be secondary to pneumonia, causing cerebral symptoms, the pus in the tympanum containing pneumococci, and be entirely overlooked, especially in children ; or (ii), may apparently be the origin of the lung trouble, without local signs of extension of disease from the tympanum, or in which suppurative cerebral and spinal meningitis, or foci in other parts, may also be present, the infection in all situations being either due to staphylococci, streptococci, or bacillus coli.

ARTHUR CHEATLE.

C.—METHODS OF EXAMINATION AND TREATMENT.

118. BREITUNG, M., Coburg. Some remarks on the practical use of Gellé's experiment. *Monatschr. f. Ohren.*, 1899, No. 6.

119. BING, ALBERT, Vienna. On Gellé's experiment. *Ibid.*, 1899, No. 4.

120. TEICHMANN, Berlin. On a uniform presentation of the results of the examination of hearing. *Ibid.*, 1899, No. 5.

121. BONNIER, P. Un procédé simple d'acoumétrie. *Arch. internat. de laryng.*, etc., vol. xii., No. 2.

122. COURTADE. Recherches sur la simulation de la surdité unilatérale. *Ibid.*

123. LIEBIG, G. VON. Treatment of ear disease in the pneu-matic cabinet. *Munch med. Wochenschr.*, 1899, No. 20.

118. BREITUNG has found that more or less pressure has to be exerted in order to obtain a positive result from Gellé's ex-periment, owing to differences in the conditions of the drum membrane and ossicles. Light pressure suffices where the mid-dle-ear apparatus is very elastic, otherwise stronger pressure has

to be exerted, and even this is insufficient in marked changes, and the result is negative. He thinks that these differences are of prognostic value.

119. BING opposes some of the statements of Bloch, calling to mind that a negative result of Gellé's experiment is proof of an impediment in sound conduction, but its practical value is far less than that of Rinne's experiment. The requisite air pressure influences the ear in such a way as to make it difficult to distinguish whether a given tone becomes stronger or not.

120. TRICHMANN's diagram deserves preference over the symbolic otological annotations, and affords a quick and convenient comprehension of the results of the functional examination of hearing.

121. To obtain a uniform and comparable foundation for the functional examination of the ear, BONNIER proposes to use a tuning-fork of 100 v.d. and note the time at which the visible vibrations of the fork begin to disappear. The ear examined hears the fork until so and so many seconds before or after that time.

122. COURTADE uses a binaural hearing tube constructed like the popular binaural stethoscope. The free ends of the (elastic) tubes are put into the patient's ears; the common tube ends in a funnel-shaped sound-receiver, before which a deep-sounding tuning-fork is held. Unobserved by the patient, the elastic tube of the sound ear is compressed. If the patient continues to hear the sound he is a malingerer. This test is a modification of one first recommended by Dr. Coggin, of Salem, published in the *ARCH. OF OTOL.*, vol. viii., p. 177, in 1879, and several others, have since been made known. TRANSLATOR.

123. V. LIEBIG, bacteriologist in Reichenhall, collects the publications relating to the cure of deaf-mutes by the pneumatic cabinet, one of which has recently been added to the therapeutic resources of Reichenhall. The results mentioned are "marvellous," but unfortunately communicated by Liebig without any criticism. They read like the advertisements in secular papers—35 per cent. of perfect cure, among which are cases of chronic suppuration, polypi, and exostosis. SCHEIBE (Münich).

d.—DEAF-MUTISM.

124. FAY, EDW. ALLEN. Marriages of deaf-mutes in America. Volta Bureau, Washington, 1898.

125. LOVE, KERR J., and ADDISON, M. A demonstration on

the education of deaf-mutes. Address to the Glasgow Medical Society, Jan. 18, 1899. *Glasgow Med. Jour.*, April, 1899.

124. The work of FAY, 527 pages, contains most accurate statistics, from which the following conclusions are drawn : Marriages between deaf-mutes are more frequent in America than in Europe ; 23.1 % of former pupils of American deaf-mute schools are married, in Europe 7-12 % only, in Denmark as much as 23 %.

Marriages of deaf-mutes have steadily increased in the present century.

Marriages between deaf-mutes on both sides are more numerous than between deaf-mutes and non-deaf-mutes.

Marriages of congenital deaf-mutes give birth to more deaf-mute children than marriages of persons with acquired deaf-mutism, 12 % ; 4.2 %.

The number of deaf-mute children is increased if the deaf-mute parents are relatives, especially if, besides themselves, there are other deaf-mutes in the families

125. At a meeting of the Glasgow Medical Society, held on January 18th, KERR LOVE stated that there was no special physiognomy to mark deaf-mutes, except that, in 75 %, appearances characteristic of post-nasal growths were present. He had made comparative measurements of the chest, height, etc., and found that, with one notable exception, the deaf-mute had as good a physical development as his hearing fellow. The exception was, that the cranial circumference of the deaf-mute measured on an average half an inch less than the other, this being due to the fact that the cranial development which accompanied education of the hearing child, from two to seven years, was imperfect in the deaf-mute. Attention was drawn to the fact that some are not absolutely deaf. Islands of hearing may exist, but these islands are limited to sounds too high in pitch to permit of their use for teaching purposes. One case shown was discovered to have forty-one deaf-mute relatives

The important question, whether marriage between deaf-mutes should not be interfered with, was raised.

Mr. ADDISON demonstrated in a number of pupils his method, adopted in the Langside school for deaf-mutes.

ARTHUR CHEATLE.

EXTERNAL EAR.

126. WASSMUND, D. (Berlin). Ossification of auricle and Roentgenography. *Deutsche med. Woch.*, 1899, No. 27.

127. MÖLLER, JÖRGEN. On perichondritis serosa auriculæ. *Hospitalstidende*, 1899, No. 8.

128. EPHRAIM, A. (Breslau). Cyst of ear canal. *Mon. f. Ohr.*, 1899, No. 5.

129. SUGÁR, M. Tumor of the auricle. *Arch. f. Otol.*, Bd. xlv, S. 94.

130. BLAKE, C. J. Relâchement du segment postéro-supérieur de la membrane du tympan. *Ann. des mal. de l'oreille*, etc., 1899, No. 5.

131. WASSMUND. On cicatricial closure of dry, persistent perforations of the drumhead by cauterization with trichloracetic acid (O'Kuneff's method). *Deutsche med. Woch.*, 1899, Heft 7.

132. PELTESOHN. On a new simple method to close persistent perforations of the drumhead. *Berl. klin. Woch.*, 1889, No. 16.

126. The ossification of which WASSMUND writes was caused by intense congelation of the right auricle. Inflammation, with formation of vesicles, with subsequent induration and disfiguring swelling, were the consequences. A Roentgen picture of the ossified auricle is appended.

HARTMANN.

127. JÖRGEN MÖLLER criticises the statement of Hartmann, that what is usually described as hematoma auris is mostly a formation of serous cysts. He reports three cases, the nature of which was not that of hematoma, but of perichondritis serosa, with only moderate symptoms of inflammation. The serous liquid may come from the fractured cartilage or from the irritated perichondrium. Treatment: Splitting of the cysts in their whole extent and plugging of the cavity with iodoform gauze.

HARTMANN.

128. In EPHRAIM's case the cyst was at the lower meatal wall, contained serous liquid, and extended to the angle of the lower jaw. The extirpation, through an incision parallel to the ascending process of the lower jaw, was followed by facial paralysis which three weeks later began slowly to disappear.

129. SUGÁR totally removed a melanosarcoma with giant cells. When, some time later, the patient died of phthisis, no metastases were found.

130. In chronic tuberculosis (according to BLAKE) the posterior upper quadrant of the drum membrane is greatly stretched, impairing hearing by diminution of surface and resistance to sound waves. Temporary improvement may be brought about by inflation of the drum, but permanent improvement requires other treatment. He recommends a strip of rubber 2 mm × 3 mm, in size, to be introduced, folded, with forceps into the ear canal and released when in contact with the drum membrane, where it will apply itself to the anterior and posterior walls of the canal. Little pieces of newspaper, introduced wet, or pencilling with collodium may also be of service. ZIMMERMANN.

131. WASSMUND has tried Okuneff's procedure in 22 cases (16 acute, 6 chronic middle-ear suppurations). In 25 a cicatricial closure of the perforation was obtained in relatively short time. HARTMANN.

132. PELTESOHN'S communication is intended to popularize Okuneff's procedure. He has 7 cases of his own, children from three to twelve years; in 5 complete cicatrization had been obtained; in 2, who are still under treatment, the diminution of the perforation was distinct. MÜLLER (Stuttgart).

MIDDLE EAR.

a.—ACUTE SUPPURATION.

133. POOLEY, J. R. Two mastoid operations with unusual symptoms. *The Laryngoscope*, April 1, 1899.

134. BLOCH, LEO (Ekaterinoslaw). A case of empyema antri mastoidis. *Mon. f. Ohr.*, No. 4, 1899.

135. LERMOYEZ. Mastoidite de Bezold chez un nouveau-né. *Ann. des mal. d'oreille*, etc., 5, 1899.

136. HASSLAUER, W. Acute mastoid periostitis in chronic dry middle-ear catarrh. *Mon. f. Ohr.*, No. 6, 1899.

137. WEISSMANN. Des mastoïdites aiguës s'ouvrant dans le conduit. *Arch. internat. de laryng.*, etc., xii., 3.

133. POOLEY reports two cases—one of a child of nine—in whom it was necessary to open the mastoid cells. In this case the patient had severe vomiting which continued for forty-eight hours after the operation. The vomiting was projectile in character and suggested a cerebral complication. The child recovered, however, without further operation.

In the second case, the patient, a man thirty-seven years of age, had acute otitis media, followed by mastoid disease. He suffered severe pain, and during his convalescence developed acute empyema of the frontal sinus. Pooley reports these cases to point out the fact "that there may be other reasons for the symptoms of vomiting and localized pain happening during the healing of a mastoid operation than an extension to the brain or involvement of the sinus, although we must constantly have these in mind."

GORHAM BACON.

134. In BLOCH's case there were no local symptoms, but vertigo and vomiting were present. Recovery. KILLIAN.

135. LERMOYEZ found in a child of two and a half months, which had suffered from acute coryza and otorrhœa three weeks previously, during the operation an abscess under the sternocleido-mastoid muscle owing to a perforation of the medial wall of the mastoid process. The mastoid was prematurely developed and contained a sequestrum the size of a pea.

ZIMMERMANN.

136. The periostitis of the mastoid in HASSLAUER's case was doubtless caused by an infection from outside. To suppose a middle-ear sclerosis as the cause of an acute purulent periostitis is not compatible with our present nosology. Unfortunately no bacteriological examination was made.

137. WEISSMANN, based on five cases of his own, to be published later, discusses the pathogenesis of the suppurations of the mastoid through the wall of the external ear canal. In his opinion they occur only if the air cells adjacent to the meatus (cellules limitrophes) are inordinately developed at the expense of the other cells, and secluded from the centre by intumescence of the mucous membrane. The point of perforation is formed at different places of the posterior meatal wall, at times even in its cartilaginous part, so that an external subperiosteal abscess may liberate itself into the external ear canal.

ZIMMERMANN.

b.—CHRONIC MIDDLE-EAR SUPPURATION.

138. FORNS. Contribution à l'étude de la pathologie de l'oreille moyenne. *Annales des mal. de l'oreille*, etc., 1899, 4.

139. FERRERI, G. Critique sur l'état de la chirurgie intratympanique dans les suppurations chroniques et les scléroses de l'oreille moyenne. *Ann. des mal. de l'oreille*, etc., 1899, 4.

140. FOUGERON. Des diverses modes d'ouverture spontanée à l'extérieur des abcès mastoïdiens ; observation d'un cas d'ouverture en avant dans le conduit auditif externe. *Ann. des mal. de l'or.*, etc., 1894, 4.

141. MÉNIÈRE E. Observation d'un cas de périostite chronique superficielle de l'apophyse mastoïde guérie par la pulvérisation d'ipsilène iodoformé. *Arch. internat. de lar.*, etc., xii., 2.

142. PLUDER, F. Psychische Störungen nach Warzenfortsatzoperationen. *Arch. f. Ohr.*, Bd. xlv., S. 101.

143. GLEASON, G. B. Chronic suppuration of the middle ear. *Fourn. Am. Med. Assoc.*, June 10, 1899.

144. BOTEY. De la réunion précoce de l'incision rétro-auriculaire après les trépanations mastoïdo-attico-antrales. *Ann. des mal. de l'oreille*, etc., 1899, 5.

138. FORNS alleges to have also clinically observed the membranous partition wall which he has constantly found in the cadaver and which divides the drum into an anterior (tubar) and posterior (attico-antral) part (compare 3, *Zeitsch. f. O.*, xxxii., S. 185). From all the cases that have come under his care he selects three where in chronic suppuration and destruction of the lateral wall of the attic the partition wall was thickened, and neither liquid nor fluid that was introduced into the ear passed from one side to the other. Forns ascribes a good deal of importance, both physiologically and pathologically, to the existence of such a partition.

139. FERRERI, in his review of the current indications for intratympanic operations, seems to emphasize two points in particular : (1) The ossicles are always secondarily affected in suppurations, and if extracted they frequently manifest spontaneous recoveries from previous destructive carious processes ; (2) in sclerosis the removal of the stapesis, functionally, of very doubtful value.

ZIMMERMANN.

140. FOUGERON discusses the various places of perforation in mastoid suppurations and communicates one of those not quite so rare cases where chronic suppuration totally destroys the posterior upper meatal and the lateral attic walls : a spontaneous recovery analogous to the operative.

ZIMMERMANN.

141. MÉNIÈRE naively relates the following case : Acute otitis. Three weeks later swelling over the mastoid ; Ménière calls it chronic periostitis. Incision reveals a small carious patch

on the anterior lower part of the apex of the mastoid, which he scrapes and plugs without searching for a further morbid condition in the depth. Two weeks later pus is found deep in the ear canal and in the wound. The probe discovered bare bone. After different modes of treatment had been unsuccessful and another surgical interference was contemplated, Ménière chanced to read of ipsilen and by three pulverizations the suppuration was cured in two weeks.

ZIMMERMANN.

142. PLUDER relates two cases of psychosis owing to otchi-rurgical interference,—a rare occurrence.

CASE 1. Man of seventy-three years, in good circumstances; fond of alcohol, which does not well agree with him. An obstinate coryza probably made him more and more morose and brooding. He was complaining of headache and loss of memory. Acute otitis media with mastoiditis. Opening of the mastoid. Two days after the operation restlessness, delirium, apathy, ascites, icterus, death. No post-mortem. In this case the operation may have induced the psychosis, without being the cause of the fatal lesion. [A psychosis after an operation is rarely fatal. It seems not impossible that an acute cerebral abscess was present.—TRANSLATOR.]

CASE 2. Man of sixty-six years. Moderate alcoholism. Arterial sclerosis. Otherwise healthy. In 1896, mastoiditis. Opening, evacuation of deep-seated pus. A week later excited, weeping a great deal, somewhat apathetic. Sensibility of right hand somewhat reduced. Slight tendency to fall towards the left side when the eyes are closed. Symptoms increased. A deep abscess in the region of the operation had been opened. Extradural abscess. Gradually patient improved so much, that he could reassume his former occupation. "It is doubtful whether the extradural abscess was the cause of the mental derangement." A neurologist, who had been consulted, was inclined to assume a focus of softening in the internal capsule. [Circumscribed encephalo-meningitis cured by the liberation of the pus, in the opinion of the translator.]

143. GLEASON reports two cases operated on according to the method of Professor Passow. In each case there was a chronic otorrhœa, and cholesteatomatous material was removed.

GORHAM BACON.

144. BOTEY, contrary to recent methods of other authors, thinks that it is not good practice after radical operations not to

stitch the wound up immediately, nor to leave a persistent opening, but to tampon the wound, suture it on the eighth day, and insert a drainage tube, to be removed six days later.

ZIMMERMANN.

C.—CEREBRAL COMPLICATIONS OF MIDDLE-EAR SUPPURATION.

145. LUCÆ, A. Operative cure of a case of purulent otitic meningitis. *Berl. klin. Woch.*, 1899, 23.

146. HAMMOND, L. J. Remarks on the diagnosis of cerebellar abscess in children. *Arch. of Pediatrics*, June, 1899.

147. McCONNACHIE, A. D., and HARTING, C. W. A case of cerebellar abscess. *Four. Am. Med. Assoc.*, April 8, 1899.

148. GREEN, J. ORNE. Cerebellar abscesses from infection through the labyrinth. *Am. Four. Med. Sciences*, April, 1899.

149. LEDERMANN, M. D. An unusual case of sinus thrombosis and epidural abscess, complicated with malaria; operation; recovery. *New York Med. Fourn.*, May 27, 1899.

150. BOTEY, R. Otite moyenne suppurée chronique avec carie attico-antrale, thrombophlébite du golfe de la veine jugulaire, propagée à la jugulaire interne jusqu'à son tiers inférieur; ligature de la jugulaire interne à la base du cou, suivie d'extirpation de ce vaisseau dans presque toute son étendue; trépanation de l'apophyse, de l'antre et de caisse. Guérison. *Ann. des mal. de l'oreille*, etc., 1899, 5.

145. LUCÆ reports: Boy fourteen years, purulent discharge from right ear since his fourth year; for the last week pain behind the right ear, severe headache and beginning opisthotonus; temp. 30.0° C., pulse 105. At the immediate operation the dura mater over the roof of the antrum was found bare and gangrenous the size of a split pea; on introducing a probe a few drops of pus escaped. An incision into the substance of the brain liberated new pus. After the operation the symptoms persisted under the characteristic fluctuations of meningitis to disappear only after a copious discharge of pus through the opening in the dura.

On the thirteenth day after the operation the other ear, with a normal condition of the drumhead, became hard of hearing, supposed by Lucæ to be due to hyperæmia of the labyrinth. He discusses the reasons for his supposition, and cites other analogous observations.

MÜLLER (Stuttgart).

146. HAMMOND has had five cases of cerebellar abscess, occurring in children during, the past four years, and believes that there is a line of symptoms which goes to determine beyond a doubt the presence of an abscess in the cerebellum. The symptoms are as follows: Rapid loss of flesh and strength; rapid pulse and high temperature for the first seventy-two hours, followed by a decline in temperature and an increase in the rapidity of the pulse; pronounced flexure of the extremities; progressive increase in the dilatation of the pupils, never, however, becoming fixed; half-unconscious condition with uncontrollable restlessness; a peculiar indisposition on the part of the patient to obey requests made; the presence of sugar in the urine; slow respiration; if standing, tendency to go toward one side; swinging of the hands, always toward one side, and entire absence of paralysis.

GORHAM BACON

147. The case reported was that of a boy, twelve years of age, who had chronic otorrhœa (right side) following typhoid fever. A year ago he had nausea, vomiting, and vertigo. There was a sudden arrest of the discharge from the ear followed by coma. The mastoid cells were opened, the outer cortex being very dense. Cholesteatomatous material was found and free communication established between the antrum and the external meatus. The boy did not improve, but remained irritable, with a pulse of 66. The temperature was normal, pupils slightly dilated and intolerant of light. Other symptoms developed, viz., yawning, semi-consciousness, and retraction of the head. The boy died. An abscess was found in the right cerebellar lobe at the autopsy.

GORHAM BACON.

148. In this paper, GREEN reports three cases of chronic suppuration of the tympanum, complicated by caries extending into the labyrinth, and abscess of the cerebellum. The cases terminated fatally. A fourth case was also reported, viz., a case of chronic suppuration of the tympanum with caries involving the labyrinth, but unattended with any brain lesion. This patient recovered. The patient sought advice because he had suddenly become very dizzy and experienced considerable pain in the left side of the head and ear. A few days later he had a slight chill. About a week later, the operation of opening the mastoid was performed when the bone was found densely sclerosed, the antrum and aditus being full of desquamative material. There was a carious opening on the posterior part of the inner wall of the

aditus. There was pain in the stomach and constant nausea. No pain in the head.

In the four cases, there was a chronic otorrhœa which ran the usual course until there was a sudden attack of vertigo, followed soon by a dull pain in the ear. In one there was a marked increase in the deafness. The vertigo was undoubtedly due to the implication of the semicircular canals. In all cases there was marked headache. In the three cerebellar abscess cases, it was bilateral; in two of these frontal, and in the other at the vertex. In the fourth case of simple caries, the headache was unilateral on the affected side. Paralysis of the abducens occurred in two, in one bilateral, in one unilateral, on the opposite side from the ear disease. Optic neuritis was present in only one case. In Case 3, the facial paralysis was due, probably, to pressure on the nerve in the Fallopian canal. Leucocytosis was present in two of the cases of cerebellar abscess. In the fourth case, nystagmus, on looking away from the diseased ear, was well marked. Sclerosis of the bone existed in all cases. In all four cases the semicircular canal had been perforated through caries at a point where it comes against the aditus wall. In the three fatal cases the wall of the vestibule just above the Fallopian canal had been destroyed; in two of them the entire tympanic horizontal portion of that canal had also been destroyed. The cerebellar abscesses were situated in the anterior and lower portions of the cerebellum on the same side as the ear disease. Abscesses of the cerebellum were due to extension of the inflammation through the inner wall of the mastoid, or through the labyrinthine passage.

GORHAM BACON.

149. The patient, a man twenty-nine years of age, came to the hospital suffering from an attack of earache (right side). The drum-head was incised but only bloody serum escaped. The mastoid region was painful and tender on pressure and somewhat swollen. It was necessary to make several incisions in the drum-head but at no time did any pus escape. The temperature was 104.2° F. There was a marked rise and fall in the temperature for the next five or six days. He then had a decided chill. At that time a microscopical examination of the blood demonstrated plasmodium malarie. Hypodermic injections of the muriate of quinine in five-grain doses were given. Internally Fowler's solution was also administered. Although there was a temporary improvement it became necessary to open the mastoid cells. The antrum was

found filled with granulation tissue and a drop or two of pus was discovered in the tip. The lateral sinus was filled with pus. The thrombus was removed and free bleeding established from both ends of the divided sinus. The patient recovered.

GORHAM BACON.

150. BOTEY's case is not complete despite the long title. The elaborate description of the very grave case shows that the last word "Guérison," should be supplemented by "Death from Pyo-pneumothorax." Botey thinks that the last affection is to be looked upon as an independent intercurrent disease, but we have to consider that at the operation the jugular was ligated and resected, yet the sigmoid sinus, the probable original seat of the disease, remained unopened, and additionally that a gangrenous cul-de-sac, which could not be opened to the bottom, was behind the sterno-clavicular articulation.

ZIMMERMANN.

d.—OTHER MIDDLE-EAR AFFECTIONS.

151. PONTIÈRE. Corps étrangers de la caisse du tympan. *Ann. des mal. de l'oreille*, etc., 1899, No. 4.

151. PONTIÈRE's case. Otorrhœa 16 years. After the removal of a polypus there was found in the now well exposed drum cavity a curved piece of copper wire 12 mm long, resting on the promontory. The patient when a child, sixteen years ago, probably stuck it in his ear, and the physician, in endeavoring to get it out, forced it deeper in.

NERVOUS APPARATUS.

152. VEIT, Frankfurt-on-Main. Hysterical deaf-mutism. From the practice of Moritz Schmidt. *Münch. med. Wochenschr.*, 1899, No. 13.

152. VEIT reports that a man of twenty-six years woke up a deaf-mute six weeks before his presentation. In writing he could very well make himself understood. Anæsthetic regions and palsies were missing. The deafness was absolute. Attempts to speak were followed only by inarticulate sounds. After letting him read the sentence, written by the physician before him: "You will hear again in a few minutes"! he was catheterized with a good deal of difficulty, but hearing and speech returned at once.

SCHEIBE.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

153. KIDD, PERCY, and MCBRIDE, P. Discussions on asthma in its relation to diseases of the upper air-passages. *Proceed. Laryngol. Soc. London.*

154. HAAG, Bern. On the shape of the facial skull. Etiology and treatment of congenital choanal atresia. *Arch. f. Laryng.*, ix.

153. KIDD and MCBRIDE opened a discussion on asthma and its relation to diseases of the upper air passages. It is impossible to give a detailed abstract of the various opinions given by members of the society. It could, however, be gathered that treatment applied to the upper air passages in this disease was not absolutely curative although sometimes of great value. The discussion is worth careful study.

ARTHUR CHEATLE.

154. The very elaborate paper by HAAG, written under the direction of Siebenmann, first details three new cases of congenital atresia of the choanæ with particular consideration of the dimensions of the skull incident to this malformation ; then follow, in tabular arrangement, a review of all such cases published thus far, and finally remarks on the genesis of these malformations with their treatment according to Siebenmann. He draws the following conclusions : As in 26 per cent. of the cases, despite the congenital mouth-breathing, the palate was normal, the "high palate" should not be considered as the consequence of mouth-breathing alone ; it shows itself here again as one of the symptoms of leptorhinoscopy. Asymmetry of the face is not produced by the obstruction of one naris. In the so-called typical cases the obturating membrane is probably the persistent, bucco-nasal membrane (Hochstetter) moved backward in the course of its development. The author was surprised to find in two of his cases a diminutive bony framework of the lower turbinals, letting the calibre of the lower part of the nasal passages appear larger. In each of the three cases the treatment (perforation of the occluding membranes with the chisel, removal of the fragments with sharp spoons and sickle-knives, eventually resection of the posterior end of the septum) restored the sense of smell. Hearing always was normal.

ZARNIKO.

b.—METHODS OF EXAMINATION AND TREATMENT.

155. BERGEAT, HUGO (Münich). External rhinoscopy, recess of the tip of the nose. *Mon. f. Ohr.*, 1899, No. 4.

156. MÖLLER, JÖRGENS (Copenhagen). A new palate-hook. *Ibid.*, No. 6.

157. ALEXANDER, A. (Berlin). Protargol in rhino-laryngological practice. *Arch. f. Lar.*, ix.

158. SEILER, CARL. Epistaxis: its cause and treatment. *Med. Record*, May 27, 1899.

159. SCHEINKMANN, B. An instrument for use in epistaxis. *Med. Record*, May 27, 1899.

160. PETERS, W. H. A simple and perfect nasal tampon. *Four. Am. Med. Assoc.*, April 22, 1899.

161. WELLS, WALTER A. The value of thiol in nose and throat practice. *Philad. Med. Four.*, April 15, 1899.

155. BERGEAT says when we hold a heated laryngoscope under the external orifice of the nostril we can easily inspect the recessus apicis, a region the direct examination of which is connected with some difficulty.

KILLIAN.

156 The new palate-hook (MÖLLER's) is made of German-silver wire and curved in such a way as to hold it together with Türk's tongue depressor in the same hand.

KILLIAN.

157. ALEXANDER brushes protargol in a 1-per-cent. solution in pharyngo-laryngitis, massages the mucous membrane with a 5-per-cent. solution in hay-fever, and injects the same solution, after syringing, in simple, uncomplicated empyema of Highmore's antrum—all of which with very satisfactory results. Without effect is protargol in angina, pharyngo-mycosis benigna, diphtheria, tuberculous or non-tuberculous ulcerations.

ZARNIKO.

158. The causes of epistaxis are : *a*, acute traumatic ; *b*, chronic traumatic, due to infliction of slight lesions upon the mucous membrane at frequent intervals ; *c*, general symptomatic, from general systemic disorders, as typhoid fever, malaria, sun-stroke, and hemophilia ; and *d*, local symptomatic ones from the nasal mucous membrane and cavernous tissue, induced by sneezing, excitement, mucous polypi, etc.

For the treatment it is important to obtain a good view of the nasal cavity, which is accomplished by cocaineization. In spontaneous epistaxis from ulcerations thorough curetting is advisable, the surface then being covered with spunk. Cotton or lint or any other fibrous material should never be used, owing to the close adherence of the fibres. Iron is also to be avoided.

M. TOEPLITZ.

159. SHEINKMANN's instrument consists of two oblong, sausage-like rubber air chambers, united and communicating with each other by a constricted neck. The distal or nasal portion contains a blunt-pointed rod, the outer extra-nasal chamber is filled with air and retains its shape, while the nasal is collapsed. The proximal extremity of the former is provided with a spool upon which the chamber is wound up in the process of emptying its air contents into the nasal chamber, and a catcher, which keeps it from unwinding itself.

M. TOEPLITZ.

160. Three rubber condoms are cut off by PETERS to a length of $3\frac{1}{2}$ inches. A No. 9 soft rubber catheter, with a few extra holes snipped within two inches from the tip, is inserted with two inches of its tip into one condom the upper half-inch of which is tied with thread upon the catheter without obstructing its lumen. A second condom is slipped over the first, expelling all air between the two, and the upper half-inch is wrapped closely down upon the similar wrapping below it. The third condom is then applied in the same manner. This three-ply soft tampon is easily introduced when wet into the nose and inflated by the mouth. The projecting end of the catheter is bent upon itself and wrapped with a thread.

M. TOEPLITZ.

161. WELLS has seen good results from the use of thiol, an odorless artificial ichthyol, in attacks of acute laryngitis, applied as spray (2%), and in acute rhinitis as ointment (5:30) or insufflation (5:20). Subjective symptoms promptly subside. In chronic inflammations, particularly with œdematous and boggy mucous membrane, and in acute and chronic cases of gouty or rheumatic character thiol is most useful. Atrophic rhinitis is thereby not benefited.

M. TOEPLITZ.

c.—OZÆNA.

162. HAMM (Braunschweig). The treatment of ozæna by citric acid. *Münch. med. Woch.*, 1899, No. 15.

162. After cleansing the nose HAMM insufflates citric acid with sacch. alb. in equal parts 3 times daily. The fœtor temporarily disappears. Under permanent treatment in this way the secretion also diminishes.

SCHEIBE.

d.—NEW-FORMATIONS IN THE NOSE.

163. BREITUNG, MAX (Coburg). Dangerously grave collapse after the operation for nasal polypi. *Wien. klin. Woch.*, 1899, No. 22.

163. After operating on nasal polypi for half an hour one of BREITUNG's patients had a great collapse which was overcome by artificial respiration.

c.—DISEASES OF THE ACCESSORY CAVITIES.

164. WELTERT, JOS. (Neuenkirch). 23 cases of antrum empyema with consecutive orbital phlegmon. *Inaug. Dissertation*, Basel, 1899.

165. FEIN (Vienna). A powder blower for Highmore's antrum and the dry treatment of empyema with powdered nitrate of silver. *Arch. f. Lar.*, ix.

166. LUC (Paris). Contribution à l'étude de la mucocèle du sinus frontal. *Ann. des mal. de l'oreille*, etc., 1899, No. 4.

167. LUBET-BARBON et FURET (Paris). Contribution à l'étude des sinusites fronto-maxillaires. *Ibid.*, No. 6.

168. DOWNIE, WALTER. Frontal sinusitis with several illustrative cases. Address at the Glasgow Med. Soc., March 4, 1899. *Glasgow Med. Journ.*, May, 1899.

169. KARUTZ (Lübeck). Frontal sinus empyema after galvanocautery. *Arch. f. Lar.*, viii.

170. CORDES, H. (Berlin). On the treatment of affection of the frontal sinuses. *Mon. f. Ohr.*, 1899, No. 5.

164. WELTERT gives quite a complete picture of orbital cellulitis (phlegmon) from antral empyema. He found 21 cases recorded in literature, and adds two others, which were observed in the Basel Eye Hospital and rhinologically treated by Tchevandt. The orbital phlegmon is brought about by osteo-periostitic processes. The cerebral complications are mostly brain abscess with meningitis; in empyema of the sphenoid there are sinus-thrombosis, never abscess. Even in desperate cases treatment may afford improvement and recovery. HARTMANN.

165. The little instrument of FEIN admits of blowing powder from a hole in the alveolus evenly over the mucous membrane of the maxillary antrum. In two cases (!—Reviewer) of obstinate antral suppuration improvement (!—Reviewer) followed by methodical insufflation of pure nitrate of silver. The author expresses his gratitude to his highly esteemed chief, Prof. Chiari, for the permission to make these experiments in his wards.

ZARNIKO.

166. LUC's case, a woman of thirty-four, had a hard swelling

at the upper inner corner of the orbit. The operation revealed an ectasia of the frontal sinus not only into the orbit, but also backward under the dura mater, containing opalescent, ropy liquid. The fronto-nasal duct was occluded by osteosclerosis. Complete recovery [How long?—Translator]. ZIMMERMANN.

167. LUBET-BARBON and FURET's elaborate paper is based on 39 cases of suppuration of the accessory sinuses, observed during the last five years, whose histories are dispersed through the text. It contains so many, if not new, yet so well-reported details that the reading of the original is heartily recommended.

ZIMMERMANN.

168. DOWNIE's paper was read at a meeting of the Glasgow Medico-Chirurgical Society held on March 3, 1899. He found that the anterior ethmoidal cells were the seat of suppurative process in five out of six cases of latent empyema of the frontal sinus; and believes that the trouble originates in the ethmoidal cells. With regard to treatment he deprecates bougieing, catheterizing, or tapping through the nose as being futile and fraught with danger. He first removes the anterior third or more of the middle turbinal under cocaine by means of the electric cautery or cold snare; in some portions thus removed he demonstrated that one cell had developed or become distended at the expense of neighboring cells to form the walls of a large bony cyst. The fronto-ethmoidal cells are then, or subsequently, broken down by means of a small curette; thus removing one possible source of obstruction from the frontal sinus. When this is healed, he opens the sinuses by means of a mid-line incision, if there is a probability of both being affected; if on the other hand one alone is affected, the incision is made along the superciliary ridge. The greater part of the anterior wall should be removed to facilitate satisfactory examination and thorough clearing. He does not use a drainage tube into the nose but packs the cavity firmly with double cyanide gauze, the end of the packing being brought out through a counter-opening made close to the inner canthus. The incision is closed throughout, the packing being left in for from 7 to 14 days. Five interesting cases are related.

ARTHUR CHEATLE.

169. KARUTZ's case is as follows: A week after galvano-caustic treatment of the lower turbinal of a thirty-year-old workingman: intense pain in the right upper naso-orbital corner and the supra-orbital region, heaviness of head, vertigo, chilliness, general

weakness, great swelling of the nose; two days later, with increased pain, œdema of the cheek, the skin of the forehead, root of the nose, and the eyelids. In the middle nasal passage a great deal of pus, the origin of which on probing was found to be in the frontal sinus. Under antiphlogistic treatment and good drainage, recovery in two weeks. The author advises restriction of galvanocaustic interferences.

170. CORDES recommends a double chisel to remove parts of the anterior wall of the sphenoidal sinus. With an elevatory the middle turbinal can be pushed sideways and infracted to make the sphenoidal cavity accessible. If necessary the middle turbinate may be removed. The author does not seem to know the reviewer's article on rhinoscopia posterior in the *Munch. med. Woch.*, 1896, No. 33.

KILLIAN.

f.—SEPTUM.

171. BOSWORTH, F. H. Treatment of nasal stenosis due to deflective septa with or without thickening of the convex side. *Laryngoscope*, June, 1899.

172. WATSON, ARTHUR W. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

173. ASCH, MORRIS J. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

174. DOUGLASS, BEAMAN. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

175. ROE, JOHN O. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

176. GLEASON, E. B. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

171. BOSWORTH still advocates the use of the saw, with which he saws a new septum out of the old and crumpled one, in the same manner as a straight board is sawed out of a crooked log. The advantage of the operation consists in the fact that it can be performed at an office sitting, and it restores the normal respiratory function of the nose.

M. TOEPLITZ.

172. WATSON, after thorough cocaineization, makes an incision through the septum from the convex side from far behind and well forward, the cut from below upward forming a bevel, and, if a perpendicular and anterior angle is present, another incision from above downward, also bevelled, is added, meeting the first below. The thickened angle is removed in form of a wedge. The whole septum is then pushed over with the finger, whereby the lower edge of the upper fragment is made to jump over the lower fragment. The bony septum, if deflected, is broken by Adams's forceps. The redundant projecting lower fragment is removed with the saw. The incisions are made with a stout, pointed tenotome. He uses gauze pads or Roberts's pin to hold the fragments in position.

M. TOEPLITZ.

173. The principle of the operation originally devised by ASCH does not consist in cutting away the deviated portion, nor in making a perforation, but in destroying the resiliency of the cartilage, so as to straighten it and re-establish the respiratory function. From October, 1898, to April, 1899, 139 cases were operated, in addition to the 200 cases reported by Dr. Emil Mayer, without producing any complications, sepsis, hemorrhage, or perforation. The method of operation is very minutely described. The operation is performed in deviations of the cartilaginous septum only.

M. TOEPLITZ.

174. DOUGLASS, after preliminary removal of exostoses and ecchondroses and of pathological conditions of the turbinated tissues from the unobstructed side, perforates the septum along the lines of deflection in all directions at the greatest convexity. He used first a spear-knife and then a blunt-pointed bistoury. In deflections at the floor of the nose with implications of both the bony ridge and cartilage, the bone is broken from its attachment with the forceps. If the cartilage has slipped from its articulation at the floor, the knife is drawn all along this deflection. Adhesions are broken with a periosteal elevator, the fragment of the septum bent back with the finger, and splints introduced.

M. TOEPLITZ.

175. The deflection of the cartilaginous septum is almost invariably associated with deflections of the anterior osseous portion of the septum; the posterior portion is but rarely deflected. In order to straighten the septum, the direction of the anterior osseous portion is to be changed. This is best done with Roe's fenestrated comminuting forceps, with one blade made

in the form of a ring, the other fitting into it, which breaks the osseo-cartilaginous portion by slightly rotating the blades. The cartilage is cut through by two incisions crossing each other, to which lower and superior horizontal subcutaneous incisions are added, and the septum then placed in position by a flat-bladed forceps. Roe uses an antiseptic-cotton dressing.

M. TOEPLITZ.

176. GLEASON makes a U-shaped incision entirely around the deviated area with the saw and pushes the tongue-shaped flap with the finger tip through the hole in the septum. The deviated area then becomes a hanging trap-door with a spring hinge. The operation is best adapted for vertical deviations, owing to the narrowness of the flap. In horizontal deviations, owing to the greater resiliency, the flap has, in twenty per cent. of the cases, pushed back again; these cases are supported by tubes.

M. TOEPLITZ.

g.—OTHER DISEASES OF THE NOSE.

177. FALKNER, N. A peculiar clot in a case of epistaxis. *Lancet*, April 22, 1899.

178. MEYER, F. (Darmstadt). Contribution to the genesis of rhinoliths. *Arch. f. Laryngol.*, ix. (Nothing remarkable.)

179. GAREL, J. Le rhume des foins. (Actualités médicales). 96 pages. Paris, 1899.

180. GOERKE, M. (Breslau). Pathology and diagnosis of tuberculoma of the nose. *Arch. f. Laryngol.*, ix.

181. DONOGÁNY, Z. (Budapest). Contributions to the histology of the nasal septum, with particular consideration of habitual nose-bleed. *Arch. f. Laryngol.*, ix.

177. At a meeting of the Royal Academy of Medicine in Ireland, March 24, 1899, FALKNER narrated the case of a woman, aged seventy-six, who, during the course of severe epistaxis which caused her death, coughed up a blood-clot forming a cast of the posterior nares with a process about eight inches in length, which probably extended down into the œsophagus.

ARTHUR CHEATLE.

179. Based on 68 cases of hay-fever and 91 of unperiodical vaso-motory coryza, GAREL discusses practically and extensively the history, etiology, symptoms, diagnosis, prognosis, and treatment of the two affections, and arrives at the following conclusions: Hay-fever is only a variety of vaso-motory rhino-bronchitis.

The latter occurs unperiodically and, as hay-fever, periodically. Both are distinguished by their cause. The occurrence of hay-fever depends on (1) predisposition, (2) hyperæsthesia of the nasal mucous membrane, (3) an external exciting agency (pollen, for instance). The treatment must take these three factors into account. The hyperæsthesia of the nasal mucous membrane is amenable to surgical treatment only (galvano-cautery).

BRÜHL.

180. GOERKE found at the histological examination of a tuberculous tumor in and near giant cells numerous round and curved formations, staining with logwood intensely blue or violet, which at first excited suspicions of the so-called foreign-body tuberculosis. The deepest layers contained, however, tubercle bacilli, revealing the real nature of the tumor. Microchemically and tinctorially chalk, Unna's elæin, and iron-pigment were found. Probably they were degenerated vessels. The author recommends caution in the interpretation of the microscopic conditions of formations simulating foreign-body tuberculosis.

ZARNIKO.

181. DONOGÁNY gives the results of his investigations of 100 pieces of the pars cartilaginea of the nasal septum, made under Hausemann's guidance, as follows: (1) The hemorrhages of the cartilaginous septum are caused mostly by local alterations. (2) These alterations are either of pathological or embryonal origin. In the former case dilatation of the vessels, in the latter a kind of cavernous tissue is present. (3) Besides these changes, the sub-epithelial connective tissue plays an important part, rendering hemorrhage more difficult by its abundance, easier by its atrophy or absence.

ZARNIKO.

h.—NASO-PHARYNGEAL CAVITY.

182. PIFFL, OTTO (Prague). Hyperplasia and tuberculosis of the pharyngeal tonsil. *Zeitsch. f. Heilk.*, xx., 1899.

183. BARTH, EUGENE. On the technique of the operation of adenoid vegetations of the naso-pharyngeal cavity and the peritonsillar abscesses of the faucial tonsils. *Deutsch. med. Woch.*, 1899, No. 14.

184. KANTOROWICZ (Rostow-on-Don, Russia). On the diagnosis of the adenoid proliferations. *Arch. f. Lar.*, viii.

185. PATERSON, D. K. Foreign body impacted in the naso-pharynx for four years. *Proc. Lar. Soc.*, London, March, 1899.

186. WARNECKE (Berlin). Pseudo-membranous rhinitis with formation of a fibrinous tumor in the naso-pharynx. *Arch. f. Lar.*, viii.

182. PIFFL examined 100 cases of hyperplastic pharyngeal tonsils, mostly from Zaufall's clinique. In only three cases tuberculosis was surely ascertained by histological examination. All cases were clinically examined, also with regard to hereditary disposition. These investigations brought out nothing that could support the hypothesis of a tuberculous origin of the hyperplasia. Piffel advises, in cases of the least suspicion of tuberculosis, to remove the pharyngeal tonsil at once, and radically, in particular if swollen lymphatic glands are on the neck. HARTMANN.

183. BARTH removes pieces of adenoid vegetations that have been left behind, with Hartmann's conchotom. He opens peritonsillar abscesses with a pair of somewhat pointed forceps, after having first punctured and superficially incised the abscess.

NOLTENIUS.

184. KANTOROWICZ introduces a charged cotton-holder (Heryng's) high up into the pharynx and withdraws it in a few seconds. If it is stained with blood, the presence of adenoids is probable. In sufficiently wide nasal passages he introduces a probe, armed with cotton wool, as far as to touch the posterior pharyngeal wall. If blood is found on it, adenoids are probably there.

ZARNIKO.

185. A child aged six years was brought to PATERSON with discharge from the left ear, fœtid discharge from the left nostril, and nasal obstruction. Something could be seen in the posterior nares on looking through the left nostril. Under an anæsthetic a metal regulator for rubber tubing, thickly coated with phosphates, was removed. When the child was fifteen months old, while playing with the regulator, it suddenly showed difficulty of breathing; nasal obstruction had been present since that time.

ARTHUR CHEATLE.

186. WARNECKE's case refers to a woman, thirty-one years of age, who had a polypus removed from the right nostril, October, 1896. In 1897 she presented herself again at the Berlin University Ear Clinique with occlusion of the nose. Warnecke extracted, besides several hyperplastic new formations of the middle turbinal, a pedunculated tumor the size of a large cherry, hanging down from the middle turbinal into the naso-pharynx. It consisted purely of fibrine and contained streptococci and staphylococcus aureus.

ZARNIKO.

SOFT PALATE, PHARYNGEAL AND BUCCAL CAVITIES.

187. KRONENBERG, E. (Solingen). Angina and acute muscular rheumatism. *Munch. med. Woch.*, 1899, No. 27.

188. HENDELSON (Breslau). Reaction of the tonsillar tissue upon aspersion of pulverized substances. *Arch. f. Lar.*, viii.

189. CHEATLE, ARTHUR H. Polypoid growth springing from the right supra-tonsillar fossa. *Proc. Laryng. Soc.*, London, April, 1899.

190. CHEATLE, ARTHUR H. Large puma in posterior pharyngeal wall. *Proc. Laryng. Soc.*, London, March, 1899.

191. LACH, LAMBERT. Case of miliary tuberculosis of fauces, etc. *Proc. Laryng. Soc.*, London, April, 1898.

192. AVELLIS (Frankfort-on-Main). Lipoma of the tonsil. *Arch. f. Lar.*, viii.

187. KRONENBERG's patient had papillomatous proliferations of the nose removed with the cold snare. Six days later severe articular rheumatism set in which ended in death. Kronenberg considers the operation as the cause, though the course of healing was normal. Four weeks previously proliferations had been removed on the other side, followed by angina in three days.

SCHEIBE.

188. After an extensive review of the incident literature, HENDELSON communicates the experiments which he made under the auspices of R. Kayser. Even a short time after the inflation numerous finest coal particles were found in the interior of the tonsillar tissue, underneath the epithelium. The longer the time after the blowing of the powder on the tonsil, the deeper in the tissue the particles are found, whereas they become scarcer in the superficial layers. The dust particles are situated partly in the cells, partly in the interstices. If an emulsion of foreign substances (soot, cinnabar) is injected into the tonsils, a transportation of the granules by the emigrating leucocytes towards the surface is noticed, which, however, seems insufficient to be a protective action. Practical conclusions: The tonsils not being protective organs, on the contrary, receptacles of infective germs, their removal, if they are enlarged, is indicated, not only in the interest of easy respiration and deglutition, but to obviate infective diseases.

ZARNIKO.

189. A female, aged twenty, had for a month complained of

discomfort on swallowing. On examination, both tonsils were somewhat hypertrophied, and springing from the right supra-tonsillar fossa was a smooth pale mass about an inch and a half in length, hanging over the tonsil on that side. Sections showed the mass to be covered with squamous epithelium, lymphoid masses being scattered about among connective tissue in its interior.

ARTHUR CHEATLE.

190. A married woman, aged thirty-seven, came complaining of difficulty in swallowing, and a "lump" in her throat. A smooth, pink swelling, an inch and a half in breadth, situated slightly to the left of the middle line, reached from high up in the naso-pharynx downwards to the level of the top of the larynx. It was soft and fluctuating in the centre, firm at the edges, where it faded into the surrounding parts. There was a history of numerous miscarriages and some still-births. Resolution was taking place under iodide of potassium and perchloride of mercury.

ARTHUR CHEATLE.

191. LACH's patient was a female aged twenty-six, who was very anæmic and wasted in appearance, and who had suffered from a cough for about two years, with wasting for six months and a sore throat for six weeks. The mucous membrane of the fauces and adjacent part of tongue and pharynx on the left side was reddened and slightly swollen. The surface being covered with minute, superficial, clearly defined ulcers, with ashy-gray, sloughy bases. At the periphery of the affected part the ulcers were distinct, in the centre partly confluent. The upper part of the larynx, the epiglottis, ary-epiglottic folds, and arytenoids were greatly swollen and covered with superficial worm-eaten ulceration. The cords were normal. Active phthisis at both apices, with cavitation at the right.

ARTHUR CHEATLE.

192. AVELLIS's very rare case of a lipoma of the tonsils is briefly described and illustrated by two drawings.

MISCELLANEOUS NOTES.

THE OTOLOGICAL SOCIETY OF THE UNITED KINGDOM.

A society with the above title is being formed in London, the following gentlemen forming the Initiating Committee. It will be seen that the society is started under the best auspices.

E. CRESSWELL BABER, Brighton.	A. BROWN KELLY, Glasgow.
J. B. BALL, London.	RICHARD LAKE, London.
C. A. BALLANCE, London.	EDWARD LAW, London.
H. A. BALLANCE, Norwich.	L. A. LAWRENCE, London.
BARCLAY BARON, Clifton.	C. J. LEWIS, Birmingham.
THOMAS BARR, Glasgow.	P. MCBRIDE, Edinburgh.
F. W. BENNETT, Leicester.	PROFESSOR MACEWEN, Glasgow.
A. H. BENSON, Dublin.	F. MATHESON, London.
J. W. BOND, Dublin.	W. MILLIGAN, Manchester.
ADOLPH BRONNER, Bradford.	STEPHEN PAGET, London.
J. WALTON BROWNE, Belfast.	H. PEGLER, London.
W. C. BULL, London.	BILTON POLLARD, London.
ARTHUR H. CHEATLE, London.	UREAN PRITCHARD, London.
Prov. Hon. Sec.	W. LAIDLAW PURVES, London.
A. E. CUMBERBATCH, London.	A. W. SANFORD, Cork.
SIR WILLIAM DALBY, London.	J. M. E. SCATLIFF, Brighton.
GEORGE FIELD, London.	MARMADUKE SHIELD, London.
DUNDAS GRANT, London.	SCANES SHICER, London.
G. T. GUILD, Dundee.	W. H. R. STEWART, London.
F. G. HARVEY, London.	GEORGE STONE, Liverpool.
W. HILL, London.	J. B. STORY, Dublin.
W. JOBSON HORNE, London.	ST. CLAIR THOMSON, London.
VICTOR HORSLEY, London.	HERBERT TILLEY, London.
T. MARK HOVELL, London.	LOGAN TURNER, Edinburgh.
J. M. HUNT, Liverpool.	E. WAGGETT, London.
PERCY JAKINS, London.	H. SECKER WALKER, Leeds.
MACKENZIE JOHNSTON, Edinburgh.	P. WATSON WILLIAMS, Bristol.
HUGH E. JONES, Liverpool.	R. H. WOODS, Dublin.
MACNAUGHTON JONES, London.	P. MCLEOD YEARSLEY, London.

APPOINTMENTS.

ARTHUR H. CHEATLE, F.R.C.S., has been appointed Assistant Aural Surgeon to King's College Hospital, London.

J. P. W. GAY, F.R.C.S., Honorary Surgeon to the Nottingham and Notts. Hospital for Diseases of the Throat, Ear, and Nose.

R. W. HERRICK, M.D., has been reappointed Honorary Surgeon to the Nottingham and Notts. Hospital for Diseases of the Throat, Ear, and Nose.

JOBSON HORNE, M.D., M.R.C.P., Physician to the Metropolitan Throat and Ear Hospital, London.

HUGH E. JONES, M.R.C.S., L.R.C.P., Honorary Surgeon to the Liverpool Eye and Ear Infirmary.

RICHARD LAKE, F.R.C.S., Surgeon to the Metropolitan Throat and Ear Hospital, London.

W. MILLIGAN, M.D., Honorary Aural Surgeon to the Royal Infirmary, Manchester.

DONALD STEWART, M.D., Glasgow, reappointed Honorary Consulting Surgeon to the Nottingham Throat, Ear, and Nose Hospital.

H. SECKER WALKER, F.R.C.S., Surgeon to the Ear and Eye Department of the Leeds Infirmary, vice H. Bendelack Hewetson, M.R.C.S., deceased.

Obituary.

THE LATE MR. BENDELACK HEWETSON

MR. BENDELACK HEWETSON, Honorary Ophthalmic and Aural Surgeon to the Leeds General Infirmary, died on May 15th at the age of forty-nine. For some years past Mr. Hewetson's health had been a cause of anxiety to his friends, but symptoms of chronic renal disease only became threatening during the early months of this year.

Born in 1850, Mr. Hewetson was educated at the Leeds Grammar School and the Leeds School of Medicine, and after qualifying studied for some time at Moorfields and Guy's. In 1883 he was appointed Surgeon at the Leeds Dispensary, but resigned a few months later on being elected Honorary Surgeon in the

Eye and Ear Department of the General Infirmary, an appointment he continued to hold until his death.

In 1893 Mr. Hewetson was President of the Otological Section of the British Medical Association at their annual meeting in Newcastle, and in his opening address strongly advocated compulsory instruction in aural diseases in the ordinary medical curriculum.

At one time or another Mr. Hewetson was Ophthalmic and Aural Surgeon to the Yorkshire Institution for the Deaf and Dumb, Surgeon to the Reynaud Hospital, Willingham, and President of the Leeds Naturalists' Club.

SEVENTH INTERNATIONAL OTOLOGICAL CONGRESS.

Owing to the date for holding the International Medical Congress falling in 1903, it has been decided that the next International Otological Congress shall not take place in that year, but in 1902. The meeting will be held at Bordeaux, under the presidency of Dr. Moure.



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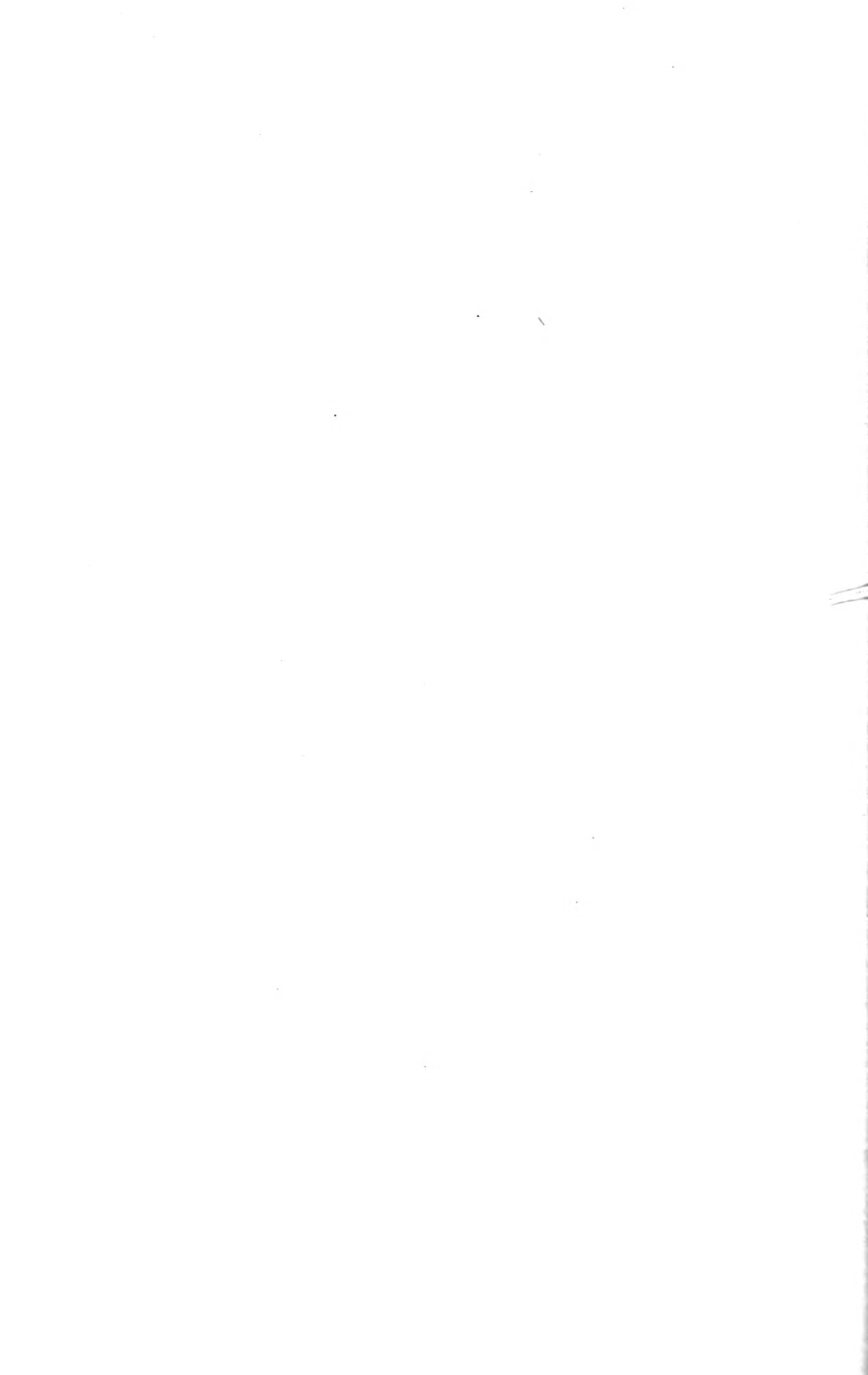
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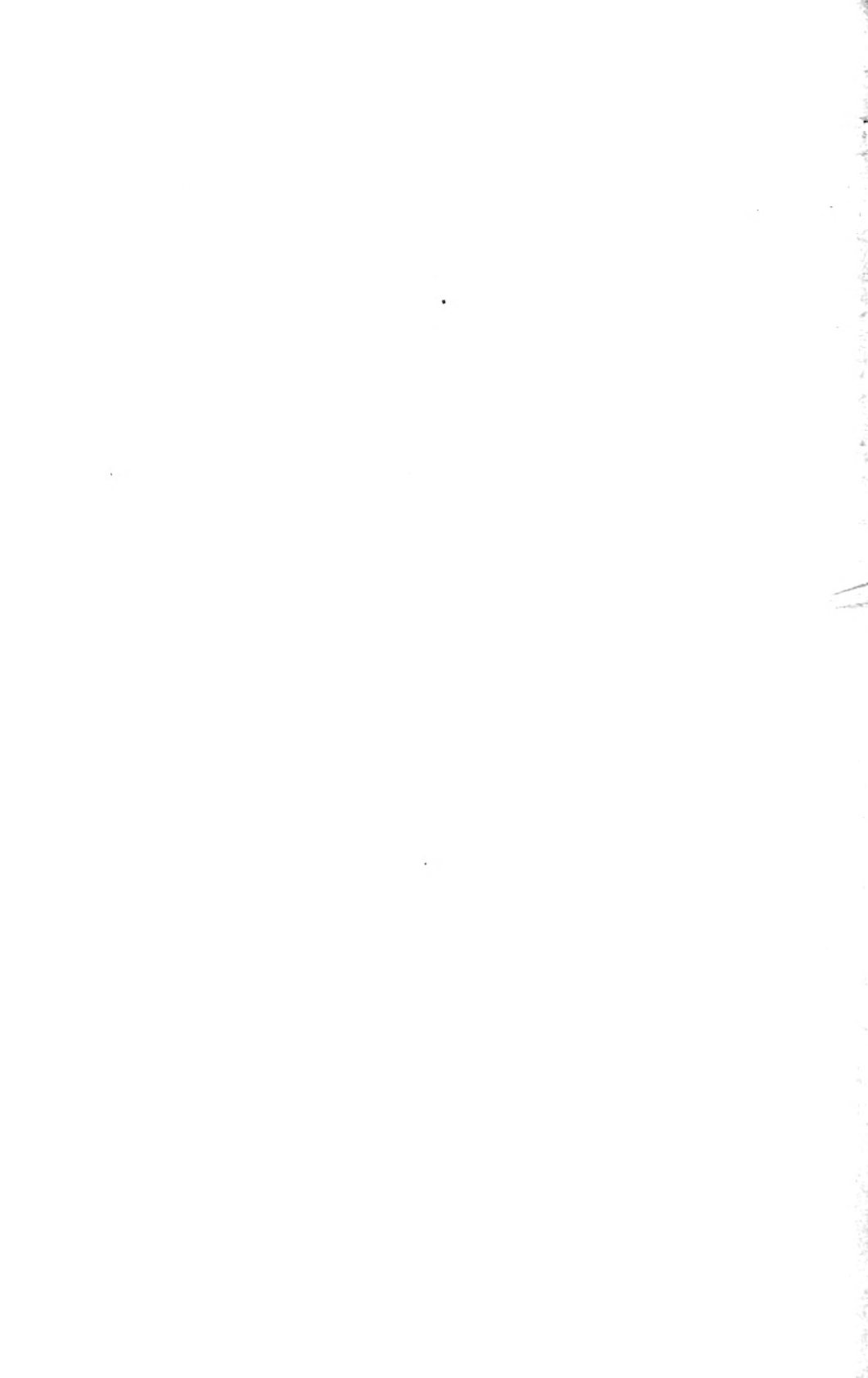
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